

DOCUMENT RESUME

ED 457 322

CE 082 216

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TITLE School-to-Work Professional Development Package for College and University Arts & Sciences Faculty, 2001.
INSTITUTION Ohio Office of School-to-Work, Columbus.
SPONS AGENCY Department of Labor, Washington, DC.; National School-to-Work Opportunities Office, Washington, DC.
PUB DATE 2001-00-00
NOTE 373p.; A publication of the School-to-Work Integration Coalition: Preservice Teacher Education Project, a collaborative effort of the State University Education Deans, the Ohio Board of Regents, and the Ohio Department of Education. For related publications, see ED 428 291 and CE 082 217. Presentations CD-ROM not available from ERIC.
PUB TYPE Guides - Classroom - Teacher (052)
EDRS PRICE MF01/PC15 Plus Postage.
DESCRIPTORS Academic Standards; Basic Skills; Beginning Teacher Induction; *College Faculty; Concept Mapping; Course Descriptions; Courses; Decision Making; Definitions; *Education Work Relationship; Educational Environment; Educational Practices; Educational Theories; Employment Qualifications; Entry Workers; Evaluation Criteria; *Faculty Development; Guidelines; Higher Education; Instructional Development; Integrated Curriculum; Learning Activities; *Liberal Arts; Models; National Standards; *Preservice Teacher Education; Reflective Teaching; Statewide Planning; Systems Approach; Teacher Certification; Teacher Competencies; Teacher Evaluation; Teacher Qualifications; Teaching Methods; Universities
IDENTIFIERS *Contextual Learning; Contextualized Instruction; Crosswalks (Linking); Decision Grid; Generic Skills; K W L Strategy; *Ohio; Reflective Practice; Secretarys Comm on Achieving Necessary Skills

ABSTRACT

This document is intended to assist organizers of professional development activities for arts and sciences faculty members of preservice teacher education programs at Ohio colleges and universities. The following materials are included: (1) a decision matrix to organize the decisions made by facilitators of professional development activities; (2) a framework for integrating school-to-work (STW) into preservice teacher education programs that includes the conceptual base and specific ideas for preparing future teachers to be effective in STW systems; (3) a presentation on contextual learning as a strategy for connecting school and work; (4) a crosswalk presentation demonstrating relationships among the ideas underpinning the framework for integrating STW into preservice teacher education and the assessment criteria listed in Ohio and national teaching standards; (5) a report discussing the identifying competencies and foundation skills identified by the Secretary's Commission for Achieving Necessary Skills as necessary for successful induction into careers; (6) a mind mapping procedure designed to enable faculty to think about STW and its relationships to preservice teacher education; (7) a K-W-L learning activity to help learners and audiences flush out their background knowledge,

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assumptions, biases, and prejudices; and (8) examples of college syllabi and ways instructors have integrated contextualized learning into their arts and sciences courses. (MN)

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2001 School-to-Work

Professional Development Package

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for College and University
Arts & Sciences Faculty

2001
School-to-Work

Professional Development Package
for College and University
Arts & Sciences Faculty

School-to-Work Integration Coalition:
Preservice Teacher Education Project

A Collaborative Effort of the State University Education Deans,
The Ohio Board of Regents, and the Ohio Department of Education

Funded by Ohio School-to-Work
2001

The original
Professional Development Package for College and University Faculty
was a publication of the work team of the third year of the project,
"School-to-Work Systems Integration Coalition:
Preservice Teacher Education Project."

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With funding from the Ohio School-to-Work Office, the State University Education Deans have established a Systems Integration Coalition to undertake this work, along with three related interuniversity projects. The Ohio State University College of Education has provided project management for the Coalition.

This publication is supported by a state grant from the Federal School-to-Work Opportunities Act of 1994. The opinions expressed herein do not necessarily reflect the position or policy of the U.S. Department of Labor, and no official endorsement by the U.S. Department of Labor should be inferred.

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Acknowledgments

This package is a result of four years of study and development by a work team of college and university faculty from across Ohio. Appreciation is extended to those individuals who contributed to this publication. Individual contributors of specific sections are identified throughout the package.

The package is one of the products created in the project, "School-to-Work Integration Coalition: Preservice Teacher Education Project." The project is one of several funded by Ohio School-to-Work through the State University Education Deans organization, in collaboration with the Ohio Department of Education and the Ohio Board of Regents.

As principal investigator, I extend my appreciation to all members of the work team, including Dora Bailey who significantly contributed to this version.. Thanks to those within the Ohio School-to-Work Office, Ohio Board of Regents, and Ohio Department of Education who made this project possible, including, but not limited to, Susan Streitenberger, Jon Tafel, Vicki Melvin, and Charlotte Coomer.

The quality of all activities of the coalition has been enhanced through the collaborative nature of the coalition, led by Sandra Pritz and Dixie Sommers of The Ohio State University. The projects of the coalition have been stronger as a result of the cross-project activities.

Finally, the support of the administration, faculty, and staff at Bowling Green State University allowed the project, including the creation of this package, to be conducted in an efficient and effective manner. Deans Les Sternberg and Ellen Williams offered support throughout the project. In addition, thanks are extended to project specialist Karen Johnson, secretary Marsha Olivarez, and the staffs of the Offices of Sponsored Programs and Research and Grants Accounting.

*Robert G. Berns
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Introduction

This package is intended to serve as a resource for organizers of professional development activities for Arts & Sciences faculty members of preservice teacher education programs at colleges and universities in Ohio. Selected material would also be applicable for use in preservice teacher education classes.

The sections of the package are listed below.

Decision Matrix

This section provides a means of organizing the decisions a facilitator of professional development activities will make.

Framework

A Framework for Integrating School-to-Work into Preservice Teacher Education Programs includes the conceptual base and specific ideas for preparing future teachers to be effective in school-to-work systems throughout the state.

Contextual Learning PowerPoint

This presentation entitled *Contextual Learning: Connecting School-Life to Work-Life: Information for Arts & Sciences Faculty* was created specifically for this package. A CD-Rom disk, note pages, and transparencies are included.

Crosswalk PowerPoint

This crosswalk presentation for Arts & Sciences faculty shows relationships among the ideas presented in *A Framework for Integrating School-to-Work into Preservice Teacher Education Programs* and Assessment Criteria of PRAXI III, the 10 Performance Areas in Ohio's Licensure Standards, and the Five Core Propositions of the National Board for Professional Teaching Standards. A CD-Rom disk, note pages, and transparencies are included.

SCANS PowerPoint

This presentation entitled *SCANS, What Work Requires of People: Adapted for Arts & Sciences Faculty* is based on A SCANS Report for American 2000, developed by the Secretary's Commission on Achieving Necessary Skills (SCANS) of the U.S. Department of Labor. This report identifies competencies and the foundation necessary for successful induction into careers.

Mind Mapping

The mind mapping procedure is explained as a means for faculty to think about school-to-work and its relationship to preservice teacher education.

CTL Learning Activity for Faculty

This includes a K-W-L strategy designed to get learners and audiences to flush out their background knowledge, assumptions, biases, and prejudices so they can connect old ideas and thoughts to new knowledge and understandings and/or adjust old perceptions.

Examples

This section includes examples of college syllabi and how instructors have woven contextualized learning throughout their arts and sciences courses.

Resource Bank for STW Technical Assistance

The Ohio State University

Sandra G. Pritz

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Objective

Make needed, quality technical assistance for school-to-work endeavors available statewide through an efficient system coordinated by higher education.

Strategy

Develop standards for school-to-work technical assistance. Design and continuously enhance a system for identifying and qualifying technical assistance resources and for soliciting expressions of need, with a procedure for matching the offerings to the needs. Use the Resource Bank platform to develop and promote performance indicators and standards for employment and training initiatives for youth (14-18) to address the Workforce Investment Act mandate. Throughout, coalesce the resources and insights of the Coalition members and market the system.

Activities

The project staff and a work team developed standards appropriate for the Resource Bank and designed a system for soliciting both offerings and expressions of need for technical assistance, operationalized as part of the School-to-Work Workforce Development Clearinghouse website (www.stwclearinghouse.org). This system will continue to be enhanced along with an operations manual to document the process for continuity and replicability. Also in Year 4, stakeholder representatives will be involved in the development of performance indicators and related standards for youth services, which will be available through the Resource Bank.

Coalition Management

The Ohio State University

College of Education

Sandra G. Pritz, Project Manager

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Principles

The Coalition has been managed according to the following principles:

- The outcomes of our cooperative labor should demonstrate the benefits of synergistic collaboration.
- Each project should be given leadership by a different institution.
- Projects should be conceived to use the value added of a multi-institutional team.
- Individuals who can add value should be able to participate on a team.
- A strong yet flexible foundation should be created to enable continued contributions to the Ohio STW system.

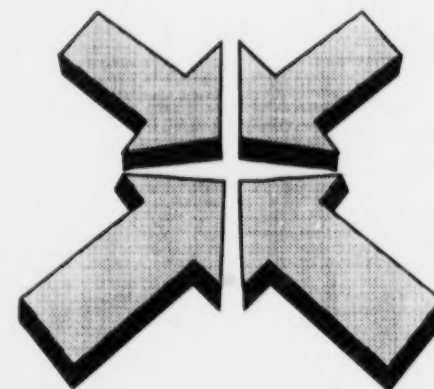
SUED is a voluntary association of state university deans which seeks to improve educational opportunities for all the people of Ohio.

"The School-to-Work Systems Integration Coalition provides an excellent opportunity for collaboration among our universities as we collectively contribute to Ohio's critical school-to-work initiatives. The outcomes achieved during the first three years of the Coalition, as well as the important activities planned for the fourth year, have led the State University Education Deans to continue to enthusiastically support the Coalition projects. We certainly appreciate the opportunity to contribute to the many benefits being realized through the efforts of a wide range of individuals and organizations in our State."

Dr. Les Sternberg

SUED Chair and Dean, College of
Education and Human Development,
Bowling Green State University

State University Education Deans (SUED) School-to-Work Systems Integration Coalition



*a collaborative effort of the
State University Education Deans,
the Ohio Board of Regents,
and the Ohio Department of Education
funded by the
Ohio School-to-Work Office*

YEAR 4

Preservice Teacher Education

Bowling Green State University
Robert G. Berns

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Objective

Prepare prospective teachers to implement new program structures, curricula, and teaching methodologies based on school-to-work concepts, principles, and practices.

Strategy

Create a faculty development package for use in orienting preservice teacher education faculty in school-to-work. Plan and implement projects at publicly and privately funded colleges and universities that move forward the integration of school-to-work into their teacher preparation programs.

Activities

The work team will revise and update the self-contained faculty development package based on a research survey of faculty and on use in orienting Education faculty about school-to-work. Also, faculty from up to 19 colleges and universities across Ohio will progress to the next level to plan and implement projects that will include the development of new or revised courses, syllabi, and materials for preservice teacher education programs. Faculty will also write manuscripts for professional publications and deliver presentations at professional meetings to disseminate information about their projects.

School-to-Work Workforce Development Clearinghouse

The Ohio State University
Susan Imel

(614) 292-8606 • imel.1@osu.edu

Objective

Provide comprehensive, systematic information to connect learning and work. Adapt as the needs of clients change.

Strategy

Continue the statewide clearinghouse with links to other existing resources, an electronic network system, and personalized assistance. Create a needs-sensing system.

Activities

In Year 1, Ohio STW stakeholder representatives were surveyed to find out what kinds of information they need and in what format. Data about the type of STW information currently available were also collected. In Year 2, with advisory board guidance, a clearinghouse was designed to "fill the gaps" by collecting and organizing the information needed and not already available through other means. A website was developed at: <<http://stwclearinghouse.org>>. In Year 3, a website section featuring Ohio STW Showcase Practices was made available through a searchable, on-line database. In addition, a read-only listserve was created to encourage exchange of STW information among stakeholders. In Year 4, an electronic newsletter will be added; the clearinghouse will continue to serve as a resource and referral agent for existing sources and will provide information to meet changing needs of clients.

Reconceptualizing School Counseling

The Ohio State University
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Objective

Provide professional development and current materials to counselor educators to improve their capacity to integrate school-to-work concepts into their programs for preservice counseling students according to a reconceptualized model of school counseling. Continue to provide professional development and current materials to additional practicing school counselors and develop an on-site model prototype.

Strategy

Continue to work with a statewide work team with representation from counselor education training programs, the Student Development Division at the Ohio Department of Education, and professional counseling associations. Disseminate the reconceptualized school counseling model and related materials, emphasizing strategies for counselor educators to foster counseling that helps K-12 students make the transition from school to work.

Activities

Continue development of a training manual to be used by counselor educators. Train counselor education faculty in the implementation of the model and the materials developed. Implement the model program with a focus on the needs of at-risk youth and use the site to train others.

Decision Matrix
Planning Professional Development
College and University Arts & Sciences Faculty
Connecting School-life with Work-life

Dora L. Bailey
Youngstown State University
September 2000

DECISION MATRIX

It is assumed that almost everyone with whom you are working will need oriented to the contextual learning perspective that is central to intertwining School-life to Work-life. Faculty will probably be at varying stages of incorporating contextual learning into their coursework. This notebook is designed to give mental framework for focusing on increasing real life contextual experiences for students in the content studies. The "Framework for Integrating School-to-Work into Preservice Teacher Education Programs" pamphlet serves as a backdrop for these thoughts. Therefore, this document is suggested as a reference for you as you plan your presentations. This notebook will help you organize the experience you are planning for Arts and Sciences faculty at your college or university.

Although we have not predicted all of decisions that you will need to make as you plan your session, we have identified some of the dynamic decisions that you will need to consider. These decisions include whether or not you need to make a pre-assessment of the level of knowledge that your fellow faculty have about School-to-Work, or whether or not you want to do a building process with a one-hour introduction followed by one or two longer sessions. Other factors to consider are the size of your audience, the audience representation, and the time frames you have available. The Pre-Assessment section is designed to help you give audiences a tantalizing taste of the concept, Contextual Learning, in order for them to judge whether or not they want to engage in more information gathering and conversations about the concept. Recognizing that higher education audiences might be reluctant, we have built this section to allow for gradual immersion. The Audience Size section recognizes that there may only be some faculty interested in the topic or the faculty may be quite large. When you have a small audience, it is good practice to provide for frequent conversations about concepts appearing on the slides.

Therefore, there will be less material presented but more depth in considering the material that is presented. The Audience Representation section recognizes that you may want to speak to specific audiences. The common divisions in Arts & Sciences were chosen, Language Arts, Science, Social Studies, and Mathematics, although you could create your own categories. The Time Frames section makes an attempt to consider the most likely blocks of time for a faculty to give serious consideration to his topic.

We have provided a Suggested Decision Matrix with suggested sections for certain circumstances and a blank decision Matrix so that you can record your own decisions. The matrix-graphics on the next pages of this section can help you consider those decisions.

This notebook provides helpful directions to take once you have made the previous decisions. It provides materials for sessions that are merely transmission of information and for sessions that are constructivist in nature. The section references alongside of the decisions that you make refer to sections in this notebook that we think will be useful as you design an experience for your faculty in *contextual learning* that connects school-life with work-life. These sections are merely suggestions and references for the situation you describe.

DECISION MATRIX

*See pages 5-7 for suggestions on pre-assessment methods.

PRE-ASSESSMENT*	AUDIENCE SIZE	AUDIENCE REPRESENTATION	TIME FRAMES
1 Hour Introduction ➤ Assess audiences' knowledge of terms in below presentation. ⇒ Contextual Learning PowerPoint Presentation pp. 1-16	Small (2-10) ⇒ Contextual Learning PPP ⇒ Examples Section ⇒ Crosswalk PPP	<i>Language Arts Faculty</i> ⇒ Contextual Learning PPP ⇒ L.A. Example <i>Science Faculty</i> ⇒ Contextual Learning PPP ⇒ Science. Example	Three Hours ⇒ Contextual Learning PPP ⇒ One Example
Followed by 1-hr. Session ➤ SAME ⇒ Contextual Learning PPP pp. 14-23 ⇒ Mind Map Section	Medium (11-30) ⇒ Contextual Learning PPP ⇒ Examples Section ⇒ Crosswalk PPP	<i>Mathematics Faculty</i> ⇒ Contextual Learning PPP ⇒ J. D. Hoye Video ⇒ Mathematics Example	One Day ⇒ J. D. Hoye Video ⇒ Contextual Learning PPP ⇒ Crosswalk PPP ⇒ Examples Section
Followed by a 2nd 1-hr. Session ➤ SAME ⇒ Contextual Learning PPP pp. 23-33 ⇒ Crosswalk ⇒ Mind Map Section	Large (21-40) ⇒ Contextual Learning PPP ⇒ Mind Map Section ⇒ Crosswalk PPP ⇒ Skit section ⇒ SCANS PPP	<i>Social Science Faculty</i> ⇒ Contextual Learning PPP ⇒ J. D. Hoye Video ⇒ Any Example <i>All Levels</i> ⇒ Contextual Learning PPP ⇒ SCANS PPP ⇒ Examples Section ⇒ Mind Map Section ⇒ Crosswalk PPP	Two Days ⇒ J. D. Hoye video ⇒ Contextual Learning PPP ⇒ Crosswalk PPP ⇒ Examples Section ⇒ SCANS PPP ⇒ Mind Map Section ⇒ Skit section

DECISION MATRIX

PRE-ASSESSMENT
1 Hour Introduction Section - Section - Section -
Followed by 1 Session Section - Section - Section -
Followed by a 2nd Session Section - Section - Section -

AUDIENCE SIZE
Small (2-10) Section - Section - Section -
Medium (11-30) Section - Section - Section -
Large (21-40) Section - Section - Section -

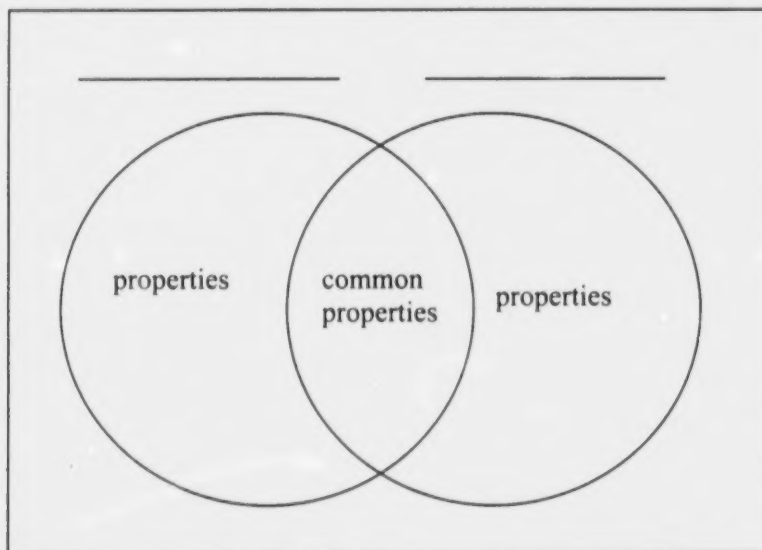
AUDIENCE REPRESENTATION
<i>Language Arts Faculty</i> Section - Section - Section -
<i>Science Faculty</i> Section - Section - Section -
<i>Mathematics Faculty</i> Section - Section - Section -
<i>Social Science Faculty</i> Section - Section - Section -
<i>All Levels</i> Section - Section - Section -

TIME FRAMES
Three Hours Section - Section - Section -
One Day Section - Section - Section - Section - Section -
Two Days Section - Section - Section - Section - Section - Section -

Pre-Assessment Methods

Venn Diagram

Whenever presentations are made with adult audiences, it is a good idea to get an idea of how much the audience knows already. Any pre-assessment also acts as a way of helping the members of the audience to bring their prior knowledge to the event. The idea in a Venn Diagram (Nagy, 1988) is to compare the properties of each of two items. The properties common to both are listed in the intersection. When two or more people do this together an observer can monitor the depth of thinking occurring and the type of thinking occurring. In addition, an observer can assess the level of prior knowledge and the way participants use their prior knowledge to engage.



The idea here is to get the audience to compare and contrast concepts with which they are familiar with concepts that they are probably unfamiliar or with which they never thought to compare and contrast. Examples of words/phrases that the audience could work on for 5 minutes are 'traditional teaching and contextual teaching', 'schooling and working', or 'school-life and work-life', and A&S Course & Programs and Education Courses & Programs. These phrases come from the initial slides in the PowerPoint Presentations. Preview the presentations to locate other words

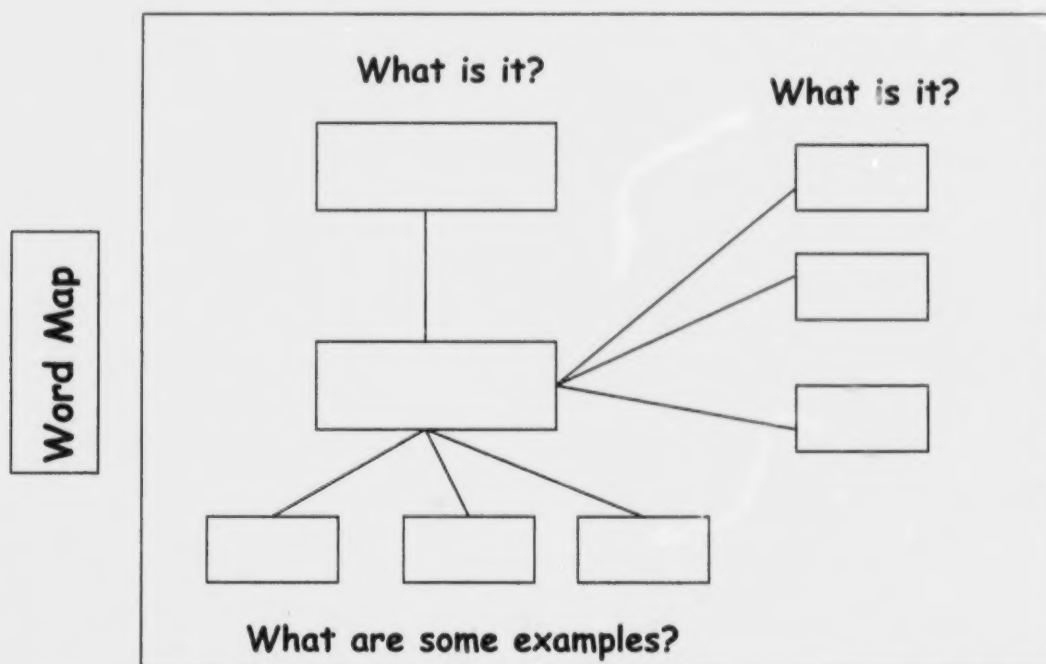
and phrases you think your audience would benefit from thinking about before you begin your presentation. There are other structures and methods that can be used as a pre-assessment. Group brainstorming is a quick and simple technique to insert any time the presenter feel a need to assess what the audience in general knows. Presenters are urged to check the professional literature for other pre- assessments if they are not comfortable with the one presented here. The pre-assessment type of activity does help the audience become active listeners as they automatically compare their work with the presentation information.

Nagy, W.E. (1988). *Teaching vocabulary to improve reading comprehension*. Newark, DE/Urbana, IL: IRA/NCTE.

Word Map

In addition to considering concepts, it is often a good idea to take a closer look at particular words within a presentation. The Word Map is another good method for thinking about words. The method presented here could be used at any time during a presentation. Schwartz and Raphael (1985) called this the *concept of definition procedure*. This procedure was developed to help children in and above the middle grades to gain control of a vocabulary acquisition process. This method teaches them the kind of information that comprises a definition and helps them use context clues and background knowledge to build a definition.

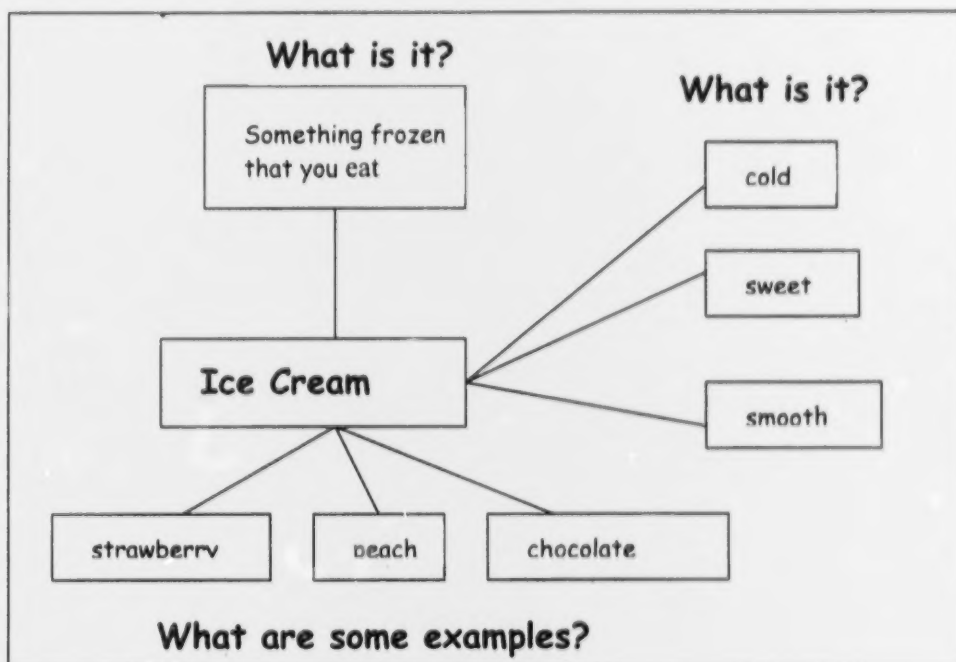
Although this was developed for children's learning, it makes a great method for discussion of prior knowledge about central concepts to a presentation. It is always a good idea to assess how much an audience knows and what are their preconceptions, collectively and individually, about the presentation topic. The visual depiction of the elements of a given concept enables discussion. Below is a blank Word Map and directions for use. As you work with this method, you will probably come up with variations in process and product.



The concept under consideration is composed of three types of information: 1) class: *What is it?*, 2) properties (that distinguish the concept from others): *What is it like?*, and 3) examples (of the concepts): *What are some examples?* After working with the Word Map participants can write a sentence including all of the information they placed on the map.

Several concepts, from these PowerPoint presentations that would work well with this method, are: school, work, contextual, teaching, and learning. As you preview the material, you will uncover many more. Although adults adapt to this kind of thinking easily, it is always a good idea to share a simplified example before encouraging them to work on any activity. Below is a simplified example (Cooper, 2000).

Completed Word Map for Ice Cream



Schwartz, R. M., & Raphael, T. E. (1985). Concept of definition: A key to improving students' vocabulary. *The Reading Teacher*, 39, 198-203.

Cooper, D. J., (2000). *Literacy: Helping Children Construct Meaning*. New York: Houghton Mifflin Company. Pp. 245-251.

**A Framework for Integrating School-to-Work into
Preservice Teacher Education Programs**

**Robert G. Berns, Editor
Bowling Green State University**

**A Framework for Integrating
School-to-Work into
Preservice Teacher Education Programs**

*A Publication of
The School-to-Work Systems Integration Coalition:
Preservice Teacher Education Framework Project*

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Regents, and The Ohio Department of Education

Funded by Ohio School-to-Work

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Introduction and Acknowledgments

This Framework is a result of a two-year discussion by a work team consisting of faculty from universities across Ohio and others representing various organizations interested in the preparation of future teachers to be effective in schools in which educational reform efforts include school-to-work. The ideas in this document have emerged from that dialogue.

The work team members' insight into the teaching and learning process allowed for the Framework to emerge as a scholarly, yet practical document. Various team members contributed to the Framework by offering ideas, organizing thoughts, writing sections, reviewing drafts, and supporting the process. Significant contributors to particular sections are acknowledged in footnotes throughout the document. These work team members are especially recognized for providing leadership in writing those sections. However, all work team members offered important input for the various sections. Indeed, this document is a result of collaboration among all of the team members. The names of the work team members are listed on the inside front cover of this monograph.

The Framework is one of the products created in the project, "School-to-Work Integration: Preservice Teacher Education Framework." The project is one of four funded by Ohio School-to-Work through the State University Education Deans (SUED) organization, in collaboration with the Ohio Department of Education and the Ohio Board of Regents.

As principal investigator of this project, appreciation is extended to all of the team members. In addition, on behalf of the work team, thanks is offered to those who reviewed the document: Dora Bailey, Cassaundra El-Amin, Patricia Hauschildt, Dean Clara

Jennings, J.D. Hoyer, Abbejean Kehler, Julia McArthur, and Sandra Pritz. Dora Bailey also assisted with the final editing of the document.

Thanks also to those within the Ohio School-to-Work Office, Ohio Board of Regents, and Ohio Department of Education who made this project possible including, but not limited to, Robert Radway, Susan Streitenberger, Jon Tafel, and Vicki Melvin. The Steering Committee of the SUED School-to-Work Coalition deserve recognition, especially Charlotte Coomer who served as the liaison from the Steering Committee to this work team.

The coalition management provided by Nancy Zimpher, Susan Sears, and Sandra Pritz of The Ohio State University not only provided effective coordination among the four SUED projects, but Sandra Pritz's liaison role on this project's work team proved critical to the achievement of the project's objectives.

Finally, the support of the administration, faculty, and staff at Bowling Green State University allowed the project, including the creation of this Framework, to be conducted in an efficient and effective manner. Deans Les Sternberg and Jim Sullivan offered support throughout the project. In addition, the many details were competently handled by secretary Marsha Olivarez, graduate assistants Lisa Willson and Julie Kandik, and the staffs of the Offices of Sponsored Programs and Research and Grants Accounting.

Appreciation is extended to all of these professionals for their many contributions to this project and, thus, to teacher education and school-to-work.

***Robert G. Berns, Principal Investigator
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Bowling Green, Ohio***

A Framework for Integrating School-to-Work into Preservice Teacher Education Programs¹

The School-to-Work Opportunities Act passed by Congress in 1994 addresses the importance of helping all students in public elementary and secondary schools acquire the knowledge, skills, abilities, and information to prepare for a smooth entry into the work environment. Although smooth entry into the work environment is the goal, this Act tends to go beyond current educational programs that lead to specified careers. Individuals discover after they leave formal schooling that learning and working are inseparable and interwoven throughout life in our contemporary society. In some cases, learning becomes a natural course whether it supports work and/or one's general quality of life. The School-to-Work (STW) initiative has sought to develop the recognition that work provides individuals the opportunity to develop in order to obtain from society what they need to live their lives (e.g., food, shelter, and leisure), and to do so in a meaningful and satisfying way. This recognition and understanding requires knowledge, skills, abilities, and information that can be learned in schools. Indeed, embracing this perspective brings relevance to learning and schools.

In order to weave the concepts of school and work into the lives of our children, educators can look at the way we teach our teachers who educate students. Through the experiences of a team of university and college faculty and educators, it was discovered that the incorporation of STW into preservice teacher education began to drive discussions and encourage refinement in respective curriculum and courses of study. The aim of the discussions has been the advancement of quality integration of STW into academic instruction in order to embody and embrace the comprehensive nature of work

¹ Robert G. Berns and Darcy Haag Granello are acknowledged for their significant contributions to this section.

and the individual's relationship to it. This document is a result of a two-year discussion by this work team, and it brings relevant philosophies to confluence in a Framework to be used by each university or college to form a basis for their own discussions.

History of Preservice Teacher Education and School-to-Work²

This document provides a description, or Framework, of how university and college faculty members, drawn from Ohio's higher education institutions and involved with preservice teacher preparation, view their roles and responsibilities and the foundation of their programs that pave the way for children to move from school-centered lives to work-centered lives. The following Framework can serve as a guide at both the macro and micro levels so that colleges and universities in Ohio can and will integrate STW into their teacher preparation programs.

For Ohio's STW system to succeed in preparing today's youth for the employment and educational opportunities of tomorrow, education, business and industry, organized labor, community-based organizations, non-profit organizations, parents, and students must forge partnerships and relationships that enable pupils to integrate school-focused and work-focused learning and foster real-world applications of discipline-related principles and concepts. Key players in these partnerships are faculty members in Ohio's universities and colleges who are responsible for preparing teachers, counselors, and administrators for the public schools.

Ohio's commitment to build a strong and comprehensive STW system depends on strengthening the connections between education

² Robert G. Berns, Dora L. Bailey, and Abbejean Kehler are acknowledged for their significant contributions to this section.

and employment, whether that employment comes before, during or after high school graduation, vocational or technical training, college preparation, or graduate study. STW experiences are for all children (i.e., early childhood, middle childhood, and adolescents), including those children with disabilities, with limited English proficiency, and with diverse racial and cultural backgrounds. The goal is to develop in all children the competencies, confidence, and connections that can lead to successful work lives and responsible participation in the community.

This Framework is a product of a project funded by Ohio School-to-Work through the State University Education Deans(SUED) in conjunction with the Ohio Department of Education and the Ohio Board of Regents. As a part of this project, "Ohio's School-to-Work Systems Integration Coalition: Preservice Teacher Education Framework," a team of faculty from six public universities in Ohio created an initial Framework plan in 1997, intended to be an evolutionary piece, continually revised, updated and enhanced by university faculty members. University faculty who participated in the Integrating School-to-Work into Preservice Teacher Education Conference in July of 1997 advanced the Framework in both substance and form. Participants used this pilot project as a starting place for discussion and professional growth. Through the experience new partnerships were forged among colleges and universities as well as with local education agencies and regional alliances. In essence, the School-to-Work Preservice Teacher Education Project's Work Team invited all college and university faculty to become involved in the creation of this exciting new approach to education.

As a result of the second year funding for this project, the work team was expanded to include representatives from private colleges and other universities, Ohio School-to-Work Coordinators, Professional Development Center Directors, and Career Development Coordinators. In addition, principal investigators of planning and

implementation grants awarded to eight universities served on the work team. These grants provided funding for activities intended to integrate STW into preservice teacher education programs at the universities.

The following Framework provides platforms for discussions that will prompt and necessitate that each institution examine and change the composition of their program as well as the means of delivery of their preservice teacher education program. Parts of the Framework group into two general clusters; the **Contextual Framework** that includes a Vision, Mission, Philosophical Context, Rationale, and Economic Assumptions; and the **Discussion Platforms** that include Relationships of STW and School Curriculum Models, Ohio Teacher Education and Licensure Standards, and Career Theory and Practice; Strategies for Integrating STW into Teacher Education Programs, A Model for Integrating STW into Preservice Teacher Education Programs in Ohio, Outcomes, and Barriers/Issues and Solutions.

Contextual Framework for School-to-Work in Preservice Teacher Education

The Vision for Preservice Teacher Education³

As teacher education faculty at colleges and universities in Ohio, the work team sees the ultimate goal of education to be the enrichment of the lives of children by helping them gain the knowledge and skills they need to lead satisfying and productive lives. In contemporary society the quality of life is dependent on having the educational skills needed to participate fully, including those skills

³ Darcy Haag Granello and Robert G. Berns are acknowledged for their significant contributions to this section.

required for the multiple roles of citizen, worker, family member, and individual.

To prepare teachers for Ohio schools that pursue this goal, universities and colleges must meet the educational needs of aspiring teachers for the 21st century and beyond. Priorities in Ohio for the schools of the future will be based on such initiatives as the Standards for Ohio Schools, Goals 2000, STW, and BEST practices, which will, themselves, continue to evolve. These programs focus on simultaneous changes in several arenas (i.e., teacher education, schools, school and community partnership, state requirements and local curriculums). These elements, in partnership, are required to improve children's learning.

Knowledge, skills, and abilities that ensure the continuous improvement and innovation in the teaching and learning process as consistent with current research findings will be the focus of these programs. The work team sees a future where all teacher education programs in the state prepare individuals who contribute to these priorities. All teacher education programs in Ohio will use that knowledge to update their curricula and better prepare future teachers.

Today, educators know more than ever about how children learn as a result of studies and writings completed by Gardner (1987, 1993), Caine and Caine (1994), Madden (1991), Sylwester and Cho (1992), and Sylwester (1995). Education Psychology and Human Development content, theories and concepts such as learning styles, multiple intelligences, brain-based learning, metacognition and so forth become much more meaningful when placed in the context of STW. Teacher candidates familiar with STW concepts and strategies will be more effective in designing and delivering relevant classroom experiences to individual learners.

Contemporary assessments of the educational performance of United States students reinforce the notion that children need stronger skills beyond the minimal levels relating to the areas of mathematics, science, technology, and communication. In addition, current trends for globalization in work settings suggest the need to emphasize social perspectives and skills relating to international connections. Finally, some critics of the U.S. educational system have strongly advocated reform to develop school learning environments that emphasize the interdisciplinary nature of problem solving in the real world of work that children face in school and outside school.

The work team sees a future where prospective teachers learn the following teaching and learning principles:

- Children's learning is enhanced when teachers focus on the child.
- Children learn more and retain it longer when they apply their knowledge and skills to meaningful contexts.
- An important role of the teacher is to help children make connections between what they are learning and how it applies to "real world" problems (including career-oriented situations). Effective teachers facilitate children's understanding of why they should learn the content.
- Authentic (contextual) teaching is a pervasive, powerful tool in improving children's performance.
- Children learn best when new ideas are connected to what they already know and have experienced.
- Children learn best when they are actively engaged in applying and testing their knowledge using real-world problems.
- All children can learn. The wide diversity of learners in the state requires an understanding of a variety of cultures, races, aptitude levels, and interests.

- Prospective teachers will be prepared to teach effectively across a variety of disciplines, cultures, races, and aptitude levels.

The compelling nature of the need to transform preservice teacher education programs is reflected in the business literature that indicates that knowledge has become the key resource, the basis for the work of the world, and that wealth-creating activities will not be the traditional land, labor, and capital, but rather the application of knowledge to work and to multifaceted uses for the living of productive and satisfying lives. All of education must respond to an unprecedented challenge to enable children to achieve in this transformed world.

The faculty of colleges and universities throughout Ohio must play a significant role in producing teachers who are innovators and who connect with the community, including the parents of their children, businesspeople, and community leaders. These newly educated teachers will be expected to implement a curriculum that is directed toward meeting the needs of children and our society. They must be prepared to create learning environments that enable those needs to be met. They must also set high standards for all children.

School-to-work can provide a focus and a directive for organizing the academic and skill-based outcomes of formalized schooling. Prospective teachers, from the early days of preparation to the moment they enter their classrooms as professionally-licensed faculty, must be able to function successfully in the schools of the present and future.

Prospective teachers need to understand the role of STW in enhancing the curriculum and be prepared to competently contribute to effective educational outcomes. Examples of specific areas in which university preservice teachers might be prepared appear below:

- Offer experiences for students to learn a particular subject competency in the context of the workplace. Through contextual learning, children will see how a concept, piece of information, or skill is applied in work settings. From that vantage children will better retain the knowledge and will be able to apply it in new settings and other contexts.
- Offer experiences that allow children to explore career opportunities identified through career pathways and realize for themselves the need for post-secondary education.
- Offer experiences that allow children to shadow individuals in a variety of work settings.
- Support STW activities beyond their classrooms.

In order to graphically show the variety of ways that children experience work, a Work-cluster Concept Map was developed by the work team (Appendix A). Introducing children to work experiences can be accomplished through any one of the Work clusters depicted in Appendix A. The Work clusters are not exclusive but more representative and are:

- Career/Skills/Pathways,
 - Special Careers
 - Relationship to Content
- Definitions of Work,
 - Traditional Definitions
 - Emerging Definitions
- Stages of Development,
 - Childhood Play
 - Work at School
 - Work at Home
- Beliefs/Attitudes.
 - Pro-social Beliefs
 - Alternative Conceptions

The Stage of a Child's Development, depicted in the Concept Map, and child interest are principal in order to make any instructional platform outlined here relevant. How does work differ from play? Why are some activities compensated and others not? In order to address these concepts preservice teacher educators can help teachers refine their district's curriculum framework; to review it for pieces that are already embedded, and when concepts are missing, identify appropriate venues for inclusion.

Mission of School-to-Work and Preservice Teacher Education's Role

School-to-Work and Preservice Teacher Education⁴

The mission of School-to-Work in Ohio is to ensure that every Ohio child graduates from high school and beyond with the knowledge and skills needed to succeed in the ever-changing world of work – and is prepared for lifelong learning. To accomplish this, necessary components of STW must be utilized in the reformulating/reconceptualizing of preservice teacher education programs

School-to-Work involves three core elements:

- school-based learning,
- work-based learning, and
- connecting activities between the two.

School-based learning is classroom instruction based on high academic and skills standards, and work-based learning offers a wide

⁴ Robert G. Berns and Darcy Haag Granello are acknowledged for their significant contributions to this section.

spectrum of experiences to students from field trips to workplaces to job shadowing to structured training and mentoring at work sites. Examples of connecting activities include the integration of classroom and work site experiences, matching pupils with participating employers, training work site mentors, and building and maintaining bridges and communication between the school and workplaces beyond schools. For this mission to be successful, preservice teacher preparation programs need to integrate STW into the preparation of future teachers and school personnel.

School-to-Work in a Philosophical Context⁵

A successful, comprehensive and integrated STW system encourages all children to prepare for membership in their communities, whether that community is their family, peer group, class, job site, state, nation, or world. It must encourage all children to look ahead to their educational and employment opportunities and choices. It must substantially improve learning through interesting and relevant experiences that integrate school-based and work-based learning and foster real-world applications of principles and concepts.

For a school-to-work system to be effective, education is the key component. Therefore, school-to-work, both conceptually and operationally, needs to be placed in a philosophical context to determine potential points of congruence with existing school practice as well as potential points of resistance. Since STW has profound implications for curriculum design and development, it should be juxtaposed with dominant orientations to curriculum that exist in the curriculum literature. Of the numerous constructs available, perhaps the clearest one is the conceptual model offered by Elliot Eisner and

⁵ Leigh Chiarelott is acknowledged for his significant contribution to this section.

Elizabeth Vallance (1979, 1985) Their model contains four orientations to curriculum that can encompass virtually all philosophical positions usually studied in educational philosophy courses and hence, most likely to be familiar to practitioners in the field. The orientations are as follows:

- Academic Rationalism
- Development of Cognitive Processes
- Personal Relevance
- Social Adaptation/Social Reconstruction

Curriculum design and development is based upon the construction of learning environments that reflect (1) the needs of the learner, (2) the needs of society, and (3) content or knowledge needs (i.e., what is worth knowing?). The following paragraphs describe how STW relates to each of the orientations and how STW meets the needs enumerated herein

Academic Rationalism The Academic Rationalist orientation tends to be characterized by the belief that the acquisition of content is an end in itself and that some content is more valuable than others. At the elementary level, a strong basic education in the three R's is preferred over a more "process-oriented" curriculum. Students are assessed on their acquisition of this content frequently, usually through some kind of norm-referenced measurement device. Along with the three R's, science (especially physical sciences) and history are emphasized, as well as a strong grounding in traditional canons of literature.

At the secondary level, content is solidly linked with those areas most frequently associated with preparation for four-year colleges. Any specialized education is not highly valued in this orientation since it is viewed as situation specific rather than providing a solid "general" education. As might be expected, content tends to

follow the liberal arts model emphasized in most four-year colleges and universities.

The Academic Rationalist views the learner as a "tabula rasa" or an "empty vessel" needing to be filled with the most challenging, timeless content available. The learner's mind is seen as a "muscle" needing to be trained through rigorous learning and thinking experiences, especially those offered through the liberal arts. The learner is generally seen as a passive recipient of this content although one expects that while passively absorbing information, the learner's mind is actively involved in storing and retrieving this information when necessary.

Societal needs are met for the Academic Rationalist through the preparation of a well informed citizenry. Rather than training learners for specific jobs, trades, or in technical skills, a strong, general, liberal education will provide the learner with the base of information needed to tackle any job and succeed. The learner will have developed the necessary "habits of mind" to handle any job that he/she aspires to and has demonstrated the acumen for performing. Advocates of this orientation might include Robert Maynard Hutchins, Allen Bloom, William Bennett, E.D. Hirsch, Chester Finn, Lynn Cheney, Diane Ravitch, and others.

School-to-work should not be viewed as leaning too heavily on vocational education or technical preparation for specific jobs. A liberal arts background that emphasizes basic education is an important aspect of preparing individuals for "work." Instilling a work ethic into each learner is an important curricular goal that requires a challenging curriculum. The use of instructional strategies associated with STW contributes to the development of individuals who contribute to the improved welfare of the community. Therefore, STW can, indeed, be viewed as congruent with philosophical beliefs that constitute Academic Rationalism.

Development of Cognitive Processes. The second orientation, Development of Cognitive Processes, also views content as important, but as a means to an end, not as an end in itself. Content is useful inasmuch as it helps learners develop intellectual processes such as critical thinking, problem solving, decision making, and moral judgments. The major goal of this orientation is learning how to learn. Constructivist approaches to teaching and learning find support in this orientation. No specific content or subject has precedence over another, and, in a sense, all learning is viewed as vocational learning since the processes learned are useful in any job, profession, or career. This orientation tends to reduce the reliance on "classical, traditional" subjects and supports the emergence of "new" content that might be more relevant for developing thinking skills.

The learner is seen as an active participant in the learning environment because the teacher takes on a different role in guiding the developmental process of thinking rather than primarily transmitting information. Thus, the learner engages the content usually at the application level or higher on Bloom's Taxonomy. Advocates of this orientation lean heavily on Bloom's Taxonomy and especially on moving beyond simply memorizing and/or comprehending.

Society's needs are met by having a highly intellectually flexible citizenry who can adapt to the career changes these individuals will need to make throughout their lives. Businesses and industry are crying out for graduates who "know how to think" rather than those who are narrowly trained for a specific vocation or profession. This orientation prepares citizens who can handle the dilemmas presented by a post-modern world because they have developed the capacity for lifelong learning and critical thinking. Advocates of this orientation

might include John Dewey, Jean Piaget, Benjamin Bloom, Lawrence Kohlberg, and Jerome Bruner.

School-to-work is generally supported by this orientation because STW stresses the importance of the *processes* involved in work rather than specific knowledge or skills. As noted earlier, emphases tend to be placed on the intellectual skills needed to be an effective worker in any business, profession, career and life. Workers, whether entrepreneurial, management, or labor, need to be lifelong learners and highly adaptable to the ongoing changes in the world of work and the problem-solving skills necessary to succeed in that changing world. Rather than the play/work or learning/working dichotomy, the learner's development of the relationship of the concept of work, learning and play from home and school experiences is an important belief in STW within this document.

Personal Relevance. The third orientation, Personal Relevance, closely follows the existentialist philosophy. The individual learner best determines the content knowledge one needs to appropriate from all the possible content available. The key element of the Personal Relevance orientation is choice. The learner should decide which outcomes s/he needs to meet, which learning experiences will best enable the learner to reach those outcomes, the order in which those experiences will be encountered, and the manner in which the attainment of outcomes will be assessed. This makes the learning authentic to the learner and the outcomes meaningful to attain. Along with free choice, the learner also assumes responsibility for his/her learning. The term, self-motivation, becomes a redundancy since the learner will choose what s/he wants to learn. In essence, educators don't "teach" anyone anything. The learner chooses to learn or chooses to resist what educators want her/him to learn. Ultimately, the choice of content learned is up to the learner.

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Clearly, learner needs are met through the choices made. The teacher takes on the role of resource person or sometimes, co-learner. The individual can choose to move as quickly or slowly as she or he wants through the curriculum outcomes that are selected. "Currere" (the root word of curriculum) becomes the experience of running the race rather than the race course to be run. The learner thus becomes an authentic 'whole' person rather than whatever the educational system wants her/him to be.

Society's needs are met through the development of these "whole" persons. A self-actualizing population is a mentally healthy, productive population. Individuals who learn to make choices and take responsibility for their actions should not need the threat of laws and rules to govern their actions. As long as they understand the social consequences of individual actions, these individuals should contribute to the development of a healthy society. Advocates of this orientation might include Carl Rogers, Art Combs, Rollo May, William Glasser, A. S. Neill, and, of course, Jean-Paul Sartre and Albert Camus.

The implications of the Personal Relevance orientation for STW are rather intriguing. STW allows for greater choice in selecting and preparing for one's life's work which may include a variety of work and career experiences. By learning more about the wide variety of careers throughout an individual's education, learners can make better-informed work and career choices throughout their lives.

School-to-work also advocates the development of responsible workers willing to face the consequences of their actions. Providing work-based learning opportunities is important as is self-evaluation in assessing one's progress toward career goals. Experiences at work sites in the community should be predicated on what the learners would find to be personally meaningful.

Social Adaptation/Social Reconstruction Social

Adaptation/ Social Reconstruction are really opposite sides of the same concept. Social advocates see content as being determined by what is needed to best fit into society. This content includes the knowledge, skills, and attitudes necessary to raise a family, get a job, earn a living, and contribute to the maintenance of the social fabric. Preparation to meet society's needs include all college preparatory experiences, vocational/technical experiences, and/or family living experiences. The belief is that society needs learners who can easily assimilate and adapt to the ever-changing demands of the existing economic system.

The Social Reconstructionist, on the other hand, believes that content knowledge should be used to teach learners how to change society. The current dominant culture is beset by a variety of social ills, and Social Reconstructionist believe that merely to teach learners to fit into that flawed social fabric is miseducative. Advocates of this orientation tend to use critical theory as their content and critical pedagogy as their teaching technique.

In the Social Adaptation orientation, learners' needs are met by preparing them for specific roles in the world of work, in the community, and in the family. In other words, learners' needs are met by meeting institutional needs. The Social Reconstructionist sees learner needs being met by creating change agents who can proactively identify social ills and work to correct them. Inherent in this process is an analysis of the problems created by a capitalist economic system and the implicit class structure it creates when a segment of society provides labor for wages while another segment gains profits based on capital invested. The problems that result from the ensuing class struggles provide the basis for change.

Society's needs are met for the Social Adaptationist by first identifying the specific social needs and then providing curricular experiences that prepare learners to meet those needs. By identifying the skills one needs for whatever role(s) one is to assume as an adult, the basis for the curriculum is formed. The curriculum is built on meeting those needs. For the Social Reconstructionist, the ultimate goal is to create a "social utopia" where individuals are constantly working to realize an "ideal" society, free of class struggle and the widening economic gap between the "haves" and the "have-nots." Advocates of the Social Adaptation orientation might include Franklin Bobbitt, W. W. Charters, presidents of most companies, and Bill Gates. Social Reconstructionists might include Karl Marx, Paulo Friere, Henry Giroux, and Peter McLaren.

For STW, the Social Adaptation orientation probably constitutes a "best fit" in terms of the national STW philosophy. The key element would be the necessity of matching the workplace needs with the school curriculum. The SCANS materials certainly provide a linkage between the Social Adaptation orientation and many of the STW concepts since it divides work competencies into general and interpersonal (Appendix E).

The Social Reconstruction orientation provides a serious challenge to the STW philosophy because of the reconstructionists' emphasis on a critique of inequitable educational preparation that in effect creates "closed" workers and denies more intellectual and critical curricula for some. However, STW is not intended to create "mindless automatons" that will fit nicely into the "cogs of our economic machinery." Rather, balance is necessary to attain and sustain economic well-being with a commitment to social change necessary to narrow and ultimately eliminate the economic chasm between the "haves" and the "have nots."

STW pulls from each of these orientations when curricula are developed. STW builds a strong work ethic, supports character education and links successful workers with a solid foundation in basic skills and a strong liberal education (Academic Rationalism). School-to-work also helps develop lifelong learners who are highly flexible and skilled in problem solving, critical thinking, and decision making (Development of Cognitive Processes).

STW allows for choice, encourages learners to take responsibility for their decisions, and emphasizes the need for meaningful learning experiences in the school and in the workplace (Personal Relevance). Finally, successful workers need to be able to change the ineffective elements of the system from within. In other words, successful change agents must also be able to understand the system(s) they are trying to change, and to do so, they must first fit into the workplace successfully. STW contributes to that quest (Social Adaptation and Social Reconstruction)

Rationale Behind School-to-Work⁶

Individuals who will be successful in the marketplace of the 21st century will surely excel at solving problems, thinking critically, working in teams, and learning constantly on the job. In this new global and technology-driven economy, the skills of the workforce are a company's major competitive advantage. The best jobs in this emerging workplace will go to those who are academically strong and highly skilled. Even these skills will not be sufficient. Individuals must also master: listening and communicating, applying reasoning and problem-solving to work-related problems, creating teams in which leadership emerges, and exhibiting a strong work ethic. Corporate,

⁶ Darcy Haag Granello and Robert G. Berns are acknowledged for their significant contributions to this section.

community, and individual success in this new economy means that our educational system has to change, too.

Educators can no longer afford a tiered educational system with high standards of academic preparation for some, vocational preparation for others, and a low-standards general track for still others. Today's schools must offer all P-14 children challenging, relevant academics and meaningful work-based learning experiences in their communities.

The consequences of our educational system being out of sync with the changing nature of work have taken a toll on American business. More than 50% of U.S. employers say they cannot find qualified applicants for entry-level positions. It is estimated that U.S. business spends nearly \$30 billion training and retraining its workforce. Until society fully addresses the mismatch between what and how children are learning and what they will be required to know and be able to do, to ensure successful careers, this figure is likely to continue to rise.

Young people, their families, and the community expect every individual to be prepared to enter the workforce upon completion of schooling. However, adolescents who currently are engaged in work need to know what work, attitudes, responsibilities, expectations, and knowledge they are expected to possess. It is expected that schools bear the responsibility for creating successful, well-marked paths P-14 children can follow to move from school (not necessarily at the end of schooling) to first jobs or from school to continued education and training. STW connects school-based quality academic classes with experiences in the workplace. It builds partnership, understandings, and communications between schools and employers and leaves room for local control of local needs.

STW helps students, families, businesses, and the communities achieve their goals by turning local businesses and communities into classrooms for work-based learning experiences. Parents can become more actively involved in all aspects of their children's work/career exploration and development when early work based opportunities are local and are aligned with school based curricula. Appendix D attempts to show a multifaceted depiction of "The Dimensions of School" that includes three facets: levels, core areas, and delivery systems. The levels are early childhood, middle childhood, adolescents, and beyond adolescence. Core areas considered in schooling are: learners & parents, curriculum, instruction, assessment, safe schools, personnel & education services, professional development, and continuous improvement. Delivery systems used to educate our children are: public, private, chartered non-public, and home schooling.

Young workers become encouraged because their paychecks and progress successively improve, their hopes rise, and the community and the nation become stronger, because productivity increases our ability to participate in world markets. When this happens, everyone wins.

STW encourages P-14 children to develop their interests and start learning about how they might apply those interests, talents, skills and aptitudes in the world of work. P-14 children and their parents can then take an active role in planning their courses and work experiences so they can better prepare for their next steps to a job, an apprenticeship, a two-year technical or community college, or a four-year college or university. "The Dimensions of Work" (Appendix B) to be considered during these decisions are aligned in three dimensions: self/individual concerns, skills and behaviors, and beliefs and attitudes. The self/individual dimension, according to the graphic depiction on Appendix B, is concerned with developmental level,

demographics, compensation level, status and power, cultural issues, and functions of work. The beliefs and attitudes dimension tend to align along prosocial and alternate beliefs. Skills and behaviors dimension consists of two components: skills/careers and definitions of work.

Economic Assumptions⁷

A salient reason why STW has become so engaging is that it ameliorates the effects of children reaching the marketplace and the doors of an employer today and tending to arrive: (1) with scant or inappropriate skills, (2) developmentally or attitudinally unprepared, (3) clueless about what it is that they are really facing in an employment situation, and/or (4) shocked regarding the low value of their services at the entry level.

Economic factors are important motivations that drive our interest in improving school-based learning to work-based learning. Since the STW initiative is intended to result in a "better life" for individuals by providing a healthy economy, the following set of economic assumptions contributes to an understanding of the rationale behind the integration of STW in preservice teacher education so that teachers will be better prepared to meet the work needs of their children.

- A market-oriented system is based largely on the individual accepting responsibility for the quality of his/her standard of living. In general the more productive the individual, the higher the remuneration for their services.
- Productivity is a function of the experience, education,

⁷ Abbejean Kehler is acknowledged for her significant contribution to this section.

skills, motivation, general level of physical and mental health, attitudes, talents and other abilities of the individual

- The level and quality of education possessed by the individual has a direct bearing on the work opportunities for which s/he is qualified and which will be offered.
- Any individual's standard of living is a function of his/her ability to market their skills (in the broadest sense of marketing) in a competitive labor and employment marketplace.
- Employers seek employees who are best able to demonstrate and perform tasks within a set of "workplace cultural norms" (e.g., arriving on time; being ready to work; being reasonably freed from personal distractions and other outside activities; recognizing the contribution they make to the overall output; realizing the importance of competitiveness and profitability of the enterprise; being honest; and focusing on the tasks required to meet supervisors' approval).
- Market-place dynamics are already in place, such that if the employee does not contribute more to the value of the output of the organization than that employee costs in salary and benefits, then it is no longer in the best interest of the employer to extend employment.
- Private enterprise employers are profit seeking. Without a return on the investment for the business, in time, they will no longer be able to remain in business.

Of critical importance is an understanding of individuals and their role in the economic activity of work. The following list of assumptions is intended to contribute to such understanding.

- Individuals are rational decision-makers.
- People make choices relative to work based upon a set of motivating factors. Not choosing work is also a choice, which results in consequences that may or may not be anticipated by the individual.
- The resultant trade-off between work and non-work (leisure) is a part of each work-related choice. By engaging in work, an individual relinquishes time and energy, both of which have value.
- Generally, individuals are willing to work more hours as the income from those hours increases. However, some individuals choose fewer hours of work and the resultant income loss in order to devote more time to family and leisure pursuits.
- The value an individual places on a particular combination of work and leisure is subject to a cornucopia of factors such as past experiences, relationships, responsibilities, family obligations, motivations, and interests.
- Every individual experiences a limitation of choices based on skills, attitude, health, stamina, internalized or externalized motivations, aptitude, self esteem, and public or social pressure.
- Not all choice alternatives or combination of alternatives are agreeable or pleasurable. Typically, however, when an individual spends energies and resources in work, s/he receives income. With this income, the individual may choose to improve his/her standard of living by consuming additional goods and services.
- Work decisions are essentially an exchange. The exchange may occur between an individual and another individual or an individual and an employer. Of course, an individual may also be self-employed.

- Activities that improve the knowledge, skills, talent, education, opportunities, and personal attributes increase the likelihood of a rising standard of living.

The workplace is changing as the industrialized economy shifts to an information and service base. Improvements in communications and transportation systems, the downfall of Communism and resultant increasing numbers of nations and people involved with Capitalism, the aging of the people of the world and other demographic shifts, and the explosion of technology advancements are resulting in an increasingly-changing employment picture (Thurow, 1996). For example, workers no longer have to be in a specific place at a specific time to accomplish work objectives. Indeed, individuals now in work settings, and those entering, are facing radically reduced expectations with regard to stability of work life as well as the unpredictability of employment options.

Each individual must become responsible for the accumulation of knowledge and skills in anticipation of workplace changes. Although it remains unclear how employment trends will work their way through the economy, some have predicted a shorter work week, shifts to information-based technology-oriented jobs, and greater employment in the non-profit sectors of the economy. Individuals must assume the responsibility for staying on top of these trends in order to provide best for the economic security of themselves and their families.

Discussion Platforms for School-to-Work in Preservice Teacher Education

Relationship of School-to-Work and State Curriculum Models⁸

The requirements of federal and state legislative mandates are broad and more demanding than ever before. These sweeping mandates for reform issue a clarion call for making connections between and among federal and state initiatives to create a seamless curriculum which truly prepares students to be productive citizens. A body of research on effective schools has informed us that students learn best when they can actively apply and evaluate their learning using real world problems. The school- and work-based connections elaborated by STW provide strong opportunities for practitioners and preservice educators to align the Ohio Model Curriculum and the learning outcomes of the Ohio Proficiency Test with these real world programs.

The Ohio Model takes into consideration both explicit and implicit curriculum components. According to Appendix C, Explicit Curriculum consists of Content and Process. Content elements are literacy, numeracy, communications, citizenship and inquiry. Process elements are: critical thinking, creative thinking, problem solving, decision making and scientific method. It has been suggested that this listing is not complete and that at least one other element be added: demonstrated relevance of learning. The Implicit Curriculum elements are compliance, competition, cooperation, reward systems (for successes and failures), and social etiquette (e.g., punctuality, courtesy, and reliability). Again, it has been suggested that this listing is not complete and that at least one other element be added: prepared

⁸ Sharon Yates is acknowledged for her significant contribution to this section.

for integrating to workplace (e.g., positive work ethic and productivity).

The Ohio Model Curriculum has been approved as a necessary component of preservice teacher education programs; now, the alignment of the model curriculum with P-14 programs focused upon workforce development is critical. Our complex technological society requires that high school and college graduates reach levels of skill and competence that have not previously been demanded. Blue-collar workers will only comprise 10% of the workforce in 2000. "Knowledge work" jobs (Schlechty, 1997) require mastery of advanced content and higher order thinking skills previously slated for college-bound tracks. The 1991 report, *What Work Requires of Schools: A SCANS Report for America 2000*, identified foundation and basic competencies that have become a frame of reference for workplace skills. The transdisciplinary integration of the SCANS foundation and basic competencies into the Ohio Model Curriculum will assist students in making a successful transition into the world of work.

These competencies can be divided into two categories, Description of General Competencies and Description of Interpersonal Competencies. The General Competencies include: information processing, computer usage, technology usage, resourcing, oral communication, written communication, reading, mathematics usage, and systems usage. The Interpersonal Competencies include: leadership, group dynamics, problem solving, responsibility, self-confidence, self-management, sociability, integrity, and personal identification. The SCANS foundation and basic competencies can be logically aligned with the Ohio Model Curriculum and the learning outcomes for the Ohio Proficiency Test. An example follows:

The following is a learning outcome for the ninth grade Ohio Proficiency Test:

Given everyday/functional reading materials, the student will identify, locate, and use information in items regarding

21. directions of two or more steps.
22. the selection and use of appropriate reference sources and illustrative materials.
 - a Examples of reference sources/illustrative materials would be dictionary, encyclopedia, almanac, atlas, phone book, card catalog, periodical/newspaper, schedule, table of contents, and index.
 - b Examples of skills/processes would be using alphabetical order, skimming and scanning, reading charts, tables, diagrams, graphs, maps, labels, and signs.
23. the meaning of vocabulary words used on an application form
24. the use of propaganda.

A SCANS Foundation/Basic Skill that includes the same process is reading

Locates, understands, and interprets written information in prose and documents—including manuals, graphs, and schedules—to perform tasks; learns from text by determining the main idea or essential message; identifies relevant details, facts, and specifications; infers or locates the meaning of unknown or technical vocabulary; and judges the accuracy, appropriateness, style, and plausibility of reports, proposals, or theories of other writers.

It is important that all prospective and practicing educators be knowledgeable of both the learning outcomes in the Ohio Model Curriculum, which embed National Standards, and the SCANS skills. Good preparation and implementation of engaged learning focused on these outcomes can contribute toward P-14 children becoming both responsible citizens and productive members of the workforce.

Relationship of School-to-Work and Ohio Teacher Education and Licensure Standards⁹

In addition to relating STW to state curriculum models, the relationship between school-to-work and the 1998 Ohio Teacher Education and Licensure Standards needs to be explored when designing and adapting curriculum for preservice teacher education programs to integrate STW in a systematic fashion. Within a STW system, the performance of teachers is different than when operating without such a system in place. Since school-to-work actually relates to all of the 10 performance areas in Ohio's licensure standards, STW must be considered when developing teacher education curriculum intended to prepare preservice teachers so that the teacher

- has a thorough understanding and knowledge of subject matter and uses such knowledge to create effective learning experiences for students,
- understands how students learn and develop, and creates opportunities for each student's academic development,
- understands differences in how students learn and provides instruction to accommodate such diversity,
- plans instruction based on knowledge of subject matter, of students, and of curriculum goals and models,

⁹ Robert G. Berns is acknowledged for his significant contribution to this section.

- uses a variety of instructional strategies that encourage each student to develop critical-thinking and problem-solving skills,
- creates a learning environment that encourages active, engaged learning; positive interaction; and self-motivation for all students,
- effectively communicates in the classroom by using a variety of communication skills, including verbal and nonverbal techniques, technology, and media,
- effectively uses formal and informal assessment strategies to evaluate student progress,
- analyzes past experience and pursues professional development opportunities to improve performance, and
- works with parents/family members, school colleagues, and community members to support student learning and development.

A Model for Integrating School-to-Work into Preservice Teacher Education Programs in Ohio¹⁰

Integrating school-to-work concepts, principles, and practices throughout all preservice teacher education programs in all colleges and universities in Ohio is a formidable task. College and university faculties, including those involved with the preparation of new teachers, generally have not been involved with the STW initiative to date. In fact, the "School-to-Work Integration Project: Preservice Teacher Education Framework" is the first project of its kind in Ohio, and, as far as is known, in the country. Part of the Framework, thus, is to be a proposal for spreading the initiative throughout the state.

¹⁰ Dora L. Bailey and Robert G. Berns are acknowledged for their significant contributions to this section.

Integration will not occur in preservice teacher education programs without knowledgeable, supportive faculty. The professional development of faculty involved with these programs thus takes on a critical role in the process. Conducting a professional development conference, an idea first introduced by Dora Bailey in the very early stages of the project, soon became a major developmental effort of the project's work team. The resultant three-day conference that was held at Bowling Green State University in July, 1997, was the first organized professional development activity of its kind. The prototype was replicated in 1998, co-hosted by Kent State University and Youngstown State University. The conferences were evaluated so that they could serve as a platform for discussion at other universities and colleges.

During the 1997 conference, two professors of education from all public universities represented in the State University Education Deans (SUED) organization were invited to the conference. During the 1998 conference, faculty from private colleges and universities were the focus for invitation. An outline of the three day conference follows.

Integrating School-to-Work into Preservice Teacher Education: A Conference for Professors of Education

Thursday - 10:00 a.m. - 1:00 p.m.
Opening Session and Luncheon

The key note speaker was J. D. Hoyer, National Director of School-to-Work. STW regional coordinators, deans, representatives from the STW sponsoring state agencies, and other dignitaries were invited to this opening session and luncheon.

Thursday - 1:00 p.m. - 5:00 p.m.
Learning about School-to-Work

This session was a simulation created by Patricia M. Erickson where participants were asked to see themselves as a part of a Consortium on Schools for the Future that was being asked to learn about innovative systems. The participants were placed in four "subcommittees" with a facilitator/leader, who was a member of the project's work team that planned the conference. The teams wrote questions for J.D. Hoyer based on her morning speech. The teams of participants decided what their goals might be as they planned to learn about innovative practices, especially STW. Facilitators took their committees through a simulated work assignment. A large part of the simulation was attendance at two 20-minute mini workshops. The presenters were chosen for their knowledge about innovation in learning practices and/or student participation in work-based learning. Participants had two opportunities to select a mini session to attend.

Thursday Evening - 6:00 p.m. - 9:00 p.m.

Following dinner, a two hour session allowed the participants to review their own work experiences by responding to the "Individual Inventory of Non-teaching Work Experiences," review and select interview questions for the next day's externship, and become aware of the SCANS competencies for successful work lives. Participants were then given their externship assignments for the next day, and questions were answered.

Friday - 8:00 a.m. - 4:00 p.m.

Following "breakfast-on-your-own," participants drove in pairs to work sites within a one-hour driving distance. The

participants interviewed and observed workers in a variety of departments, including management.

Friday Evening - 5:30 p.m. - 8:00 p.m.
Sharing Externships

After a planned dinner, participants engaged in sharing what they learned during their externships. Sharing began by individuals reflecting about their day on a Reflection Sheet. These reflections were the backdrop for Marcia A. Rybczynski's "Creative Reconceptualization" activity where groups played with analogies that could pictorially show what was learned in the externship. After creating the pictorial representation, groups shared and explained their pictures.

Saturday - 8 :00 a.m. - 9:45 a.m.
Breakfast and Connecting STW to Preservice Teacher Education

All participants had breakfast together to foster dialogue about their externship experiences and their experiences with the conference. Then, groups of participants created a Mind Map or WEB centered around "School-to-Work and Its Relationship to Preservice Teacher Preparation." The mind mapping process and model of a mind map were shared first.

Saturday - 10:00 a.m. - 10:15 a.m.
"Sleepy River Hollow: The Dawning of a New Day" Skit

The work team performed a Readers' Theater for the participants. This skit, written by Robert G. Berns, showed a new faculty's enthusiasm for STW in relation to a myriad of fellow faculty reactions. Eventually all faculty came around to consider and value the notion of STW infused somewhere in their classes and the preservice teacher education program.

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Saturday - 10:45 a.m. - 11:30 a.m.

Action Planning and Reporting

Groups of participants created a list of ways to begin to infuse School-to-Work into their preservice teacher education programs. This list, or beginning action plan, was guided by a "Force Field Analysis" procedure, developed by Marjorie Ward. Copies of each group's list were distributed to the participants.

Saturday - 11:45 a.m. - 1:30 p.m.

Luncheon: Speaker

Dr. Ernest Savage, Associate Dean of the College of Technology at Bowling Green University, spoke about the importance and need for change and School-to-Work.

After learning about STW through the activities of the conference, the participants were encouraged to create a plan for integrating STW into preservice teacher education programs at their home institutions. Once a college or university begins to integrate school-to-work into their preservice teacher education programs, it is helpful for faculty to have an opportunity to share their progress and learn from each other. Therefore, a plan for such sharing was created and implemented in 1998.

Eight universities were provided funds to plan and implement projects that would move forward the integration of school-to-work into their preservice teacher education programs. The principal investigators of these eight projects met monthly to share plans for their projects, ideas generated during the course of their projects, and information they had learned during their projects. The names of the principal investigators are listed on the inside front cover of this document.

Strategies for Integrating School-to-Work into Teacher Education Programs

Although every college and university will integrate STW into their preservice teacher education programs in their own ways, the following strategies were discussed by the work team and might prove helpful in the process:

- Integrate STW throughout a preservice teacher education program and within specified courses, clinical opportunities, and field experiences including early experiences and student teaching
- Provide teacher education students with experiences in relevant workplace settings representing a variety of relevant career clusters and pathways. They should discover, through observation, actual experiences, and interviewing:
 - how SCANS competencies are applied in the workplace,
 - how academic content knowledge and skills are applied in the workplace,
 - how workplace problems can serve as a basis for subject matter content, and
 - how important positive attitudes and work ethics are for success in the workplace.
- Provide a vehicle for teacher education students to learn STW concepts, principles, and practices from an interdisciplinary approach.
- Provide teacher education students with a variety of suggestions for motivating their future students, including showing relationships between content being learned and careers and the workplace.

- Role model STW concepts, principles and practices within the teacher education program by building and using partnerships.

Barriers/Issues and Solutions

The implementation of any new initiative, philosophy, or strategy takes time, energy, and resources. A few of the barriers that will need to be overcome for successful integration along with possible solutions include the following:

- *Lack of knowledge and support by faculty.* Conferences will help educate faculty and gain their support. Distributing literature about STW and organizing a discussion group over the Internet would assist faculty to continue to learn more about STW techniques and methodologies.
- *No room in a student's teacher education program requirements.* STW can be integrated into existing courses, clinical opportunities, and field experiences. New models need to be continually implemented, shared and rewarded. Also preservice teachers should be queried about the effectiveness and usefulness of these approaches.
- *Lack of resources.* The STW Workforce Development Clearinghouse allows for the identification of relevant resources (www.stwclearinghouse.org/). Also, existing ERIC Clearinghouses can be used for finding resources. Publishers are gradually producing products that can be used by teachers and preservice for STW integration.
- *Lack of recognition for faculty involvement in STW.* Ohio's State University Education Deans (SUED) organization has supported the integration of STW into

preservice teacher education programs by co-sponsoring the Preservice Teacher Education Framework project. This support has also served to encourage faculty involvement in this initiative. Additional methods for involving administrators at colleges and universities in STW activities would also contribute to faculty involvement. Encouraging administrators to offer recognition and rewards to faculty involved with this integration effort would be yet another means of demonstrating support for the initiative, especially in the areas of promotion, tenure, and merit considerations.

The leaders of the STW initiative should approach administrators of colleges and universities and encourage them to offer recognition and rewards to faculty involved with the integration of STW into their teacher education curriculum. Positive impact of STW involvement on promotion, tenure, and merit decisions would provide strong incentive to faculty.

Outcomes for Preservice Teacher Education Programs Related to School-to-Work¹¹

The integration of STW into preservice teacher education programs is intended to result in outcomes such as the following. The preservice teacher will:

- Explain school-to-work concepts, principles, and practices.
- Identify knowledge and skills necessary for success in the

¹¹Robert G. Berns is acknowledged for his significant contribution to this section.

workplace (e.g., SCANS).

- Help children develop positive attitudes toward work.
- Assist parents to see connection between school, subjects, and workplace.
- Analyze how the concept of work presents itself in school.
- Analyze the connections between work and culture.
- Identify purposes for learning and utilizing academic subjects (e.g., writing, reading, math, and science) in a variety of work settings.
- Apply knowledge and skills from multiple disciplines to work environments and tasks.
- Apply STW concepts in such a way that it is seamless within the curriculum.
- Demonstrate the ability to map cross-discipline content and develop content for integration.
- Identify resources for classroom use with children when applying STW concepts, principles, and practices.
- Design lessons that will include learning in a real world context.
- Write learning objectives that apply STW concepts and principles.
- Use a variety of approaches to apply school-to-work concepts and principles.
- Use authentic assessment strategies to assess relevant student achievement.

Conclusion

The National School-to-Work initiative has been funded on the P-14 level with Ohio recognizing the necessity of educating college and university faculty for simultaneous change. Professional development of educators is an important link in advancing the STW

initiative, which addresses the need to prepare tomorrow's workers for performance in future work settings.

The speed with which colleges and universities can integrate STW in their preservice teacher education programs will be dependent upon the support gathered by faculty as they complete conferences designed to educate them about the STW initiative and its place in preservice teacher education programs. With college and university funding generally declining across the state of Ohio, and college and university faculty assuming expanding roles and functions, the time available for professional development and resultant curriculum and course modifications becomes more limited. Funds provide impetus and support for faculty to elevate STW as a priority in their professional activities.

Significant progress has been made in the integration of school-to-work into preservice teacher education programs across the state. Professional development activities for Education faculty at publicly and privately funded colleges and universities have resulted in an awareness by faculty of school-to-work and the need to prepare preservice teachers to teach effectively in a school-to-work system. Projects at eight universities have moved forward the integration process at those institutions. Plans call for additional projects at those institutions as well as up to 11 other colleges and universities during 1999. Sharing among faculty across universities has been, and will continue to be, an important approach to providing a vehicle for gathering information learned at the institutions that can be used to move the process further in a more efficient manner at all of the universities.

Also during 1999, material will be developed and packaged for use in orienting faculty and administrators at colleges and universities

on STW and the integration of STW into preservice teacher education.

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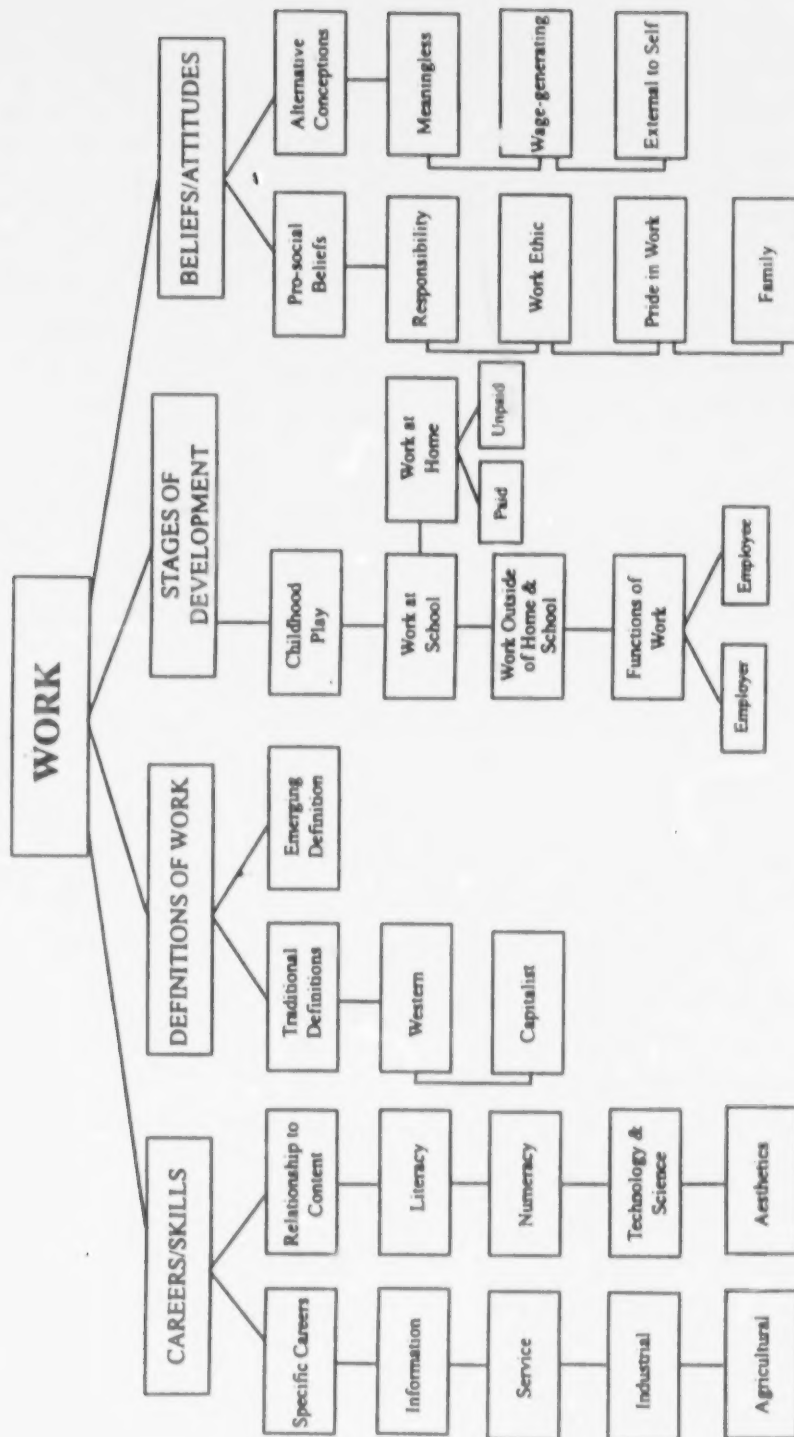
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Educate the professor, and you will educate the teachers and their students.

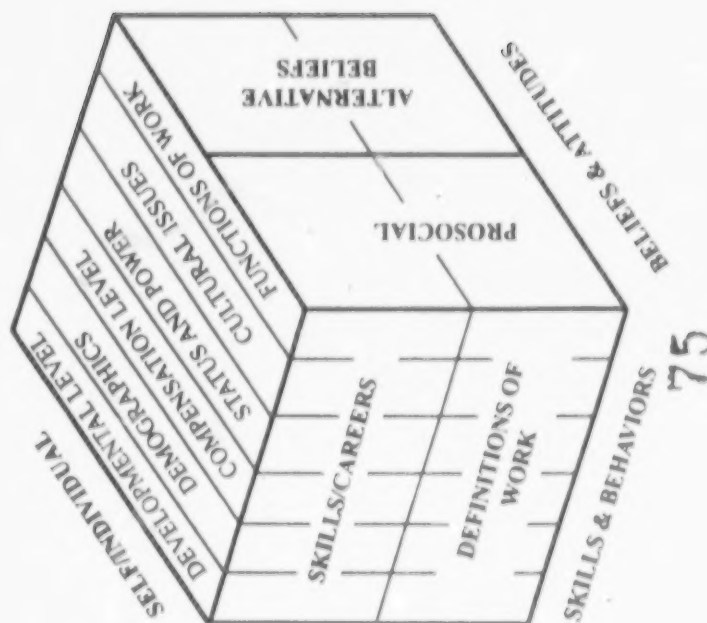
Appendix A¹²



¹²Leigh Chiarelott is acknowledged for his significant contribution to Appendix A.

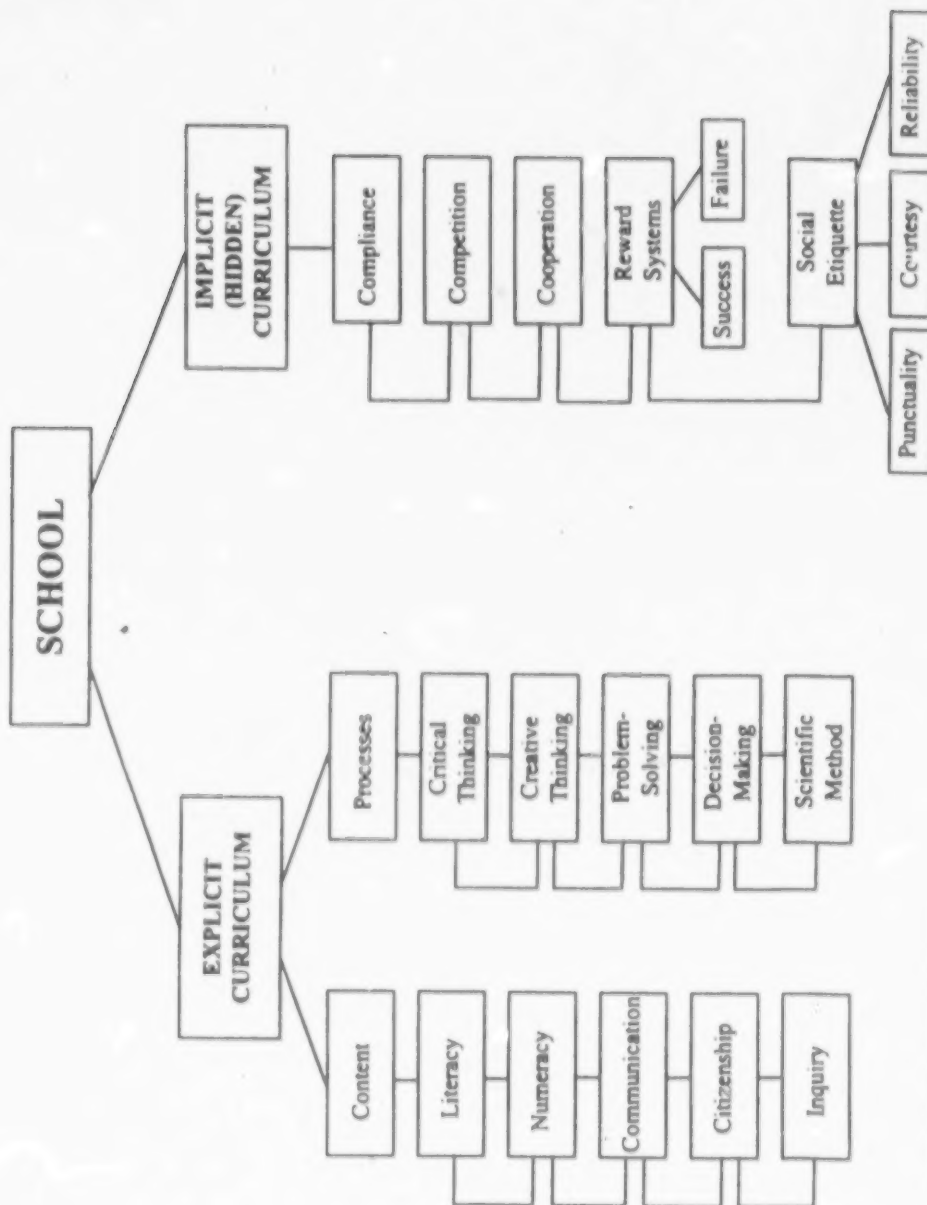
Appendix B¹³

THE DIMENSIONS OF WORK



¹³ Darcy Haag Granello is acknowledged for her significant contribution to Appendix B.

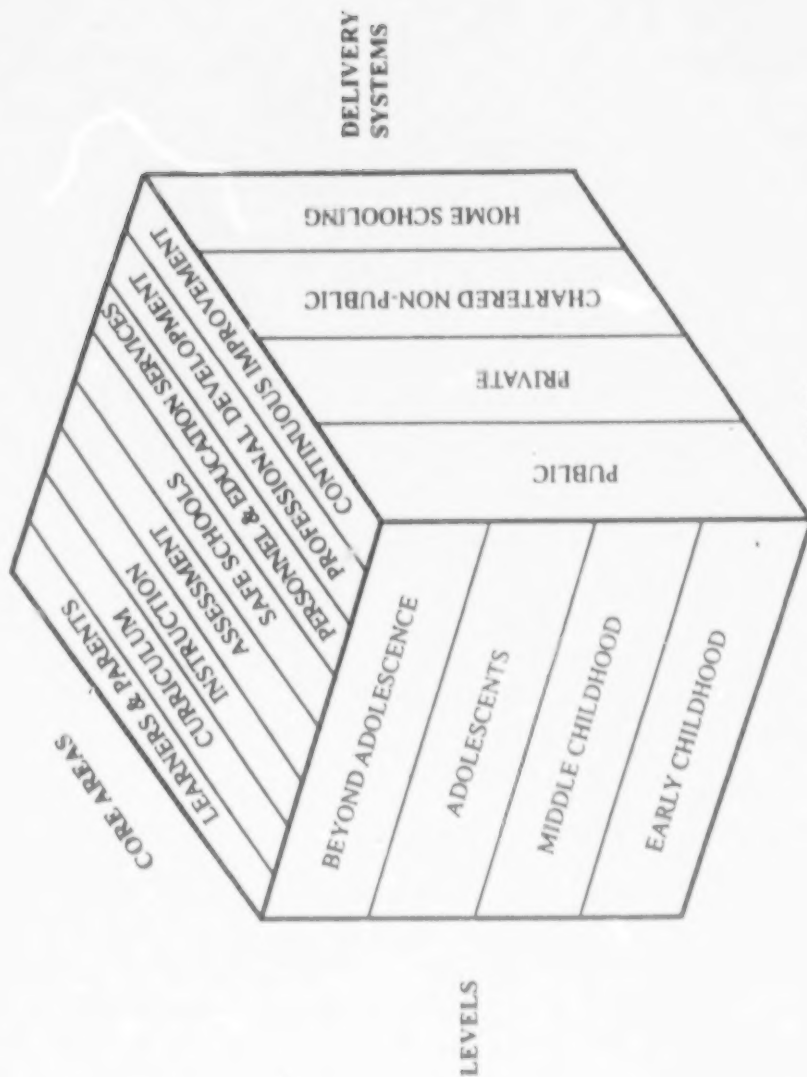
Appendix C¹⁴



¹⁴ Leigh Chiarelotti is acknowledged for his significant contribution to Appendix C.

Appendix D¹⁵

THE DIMENSIONS OF SCHOOL



¹⁵ Darcy Haag Granello is acknowledged for her significant contribution to Appendix D

Appendix E

DESCRIPTION OF GENERAL COMPETENCIES¹⁶

Information Processing

- Identifies the purpose for information search and develops an effective plan for the collection of relevant information using appropriate resources
- Locates, selects, and evaluates information in an organized manner in order to create clear and concise oral, visual, or written communication.

Computer Usage

- Demonstrates proficiency in the use of computer technology by selecting appropriate programs to fit the needs of the desired outcome.
- Operates, manipulates and integrates word processing, graphics, spreadsheet and data base software programs for written communication and graphic representation.

Technology Usage

- Selects, sets up, and uses a variety of technological tools.
- Identifies and analyzes situations to circumvent, troubleshoot, and solve problems in the respective technologies used.

Resourcing

- Plans and utilizes time, money, materials, facilities, and human resources.
- Selects appropriate human and material resources.
- Allocates human and material resources.

Oral Communication

- Organizes ideas and communicates with clarity oral messages matched to the audience and situation.
- Demonstrates listening with congruent feedback to verbal and non verbal messages.

Written Communication

- Employs the writing process to produce effective written communication for an intended audience.
- Composes, creates, and records information completely and accurately to communicate thoughts, information and messages.

Reading

- Interprets the meaning of written communication.
- Identifies and explains the main idea and relevant details, ascertains the meaning of unknown vocabulary.
- Judges the accuracy, appropriateness, and plausibility of written communication.

Mathematics Usage

- Approaches practical problems by choosing appropriately from a variety of mathematical techniques and uses data to construct logical explanations for real world situations.
- Expresses mathematical concepts orally and in writing and understands the role of chance in the occurrence and prediction of events.

Systems Usage

- Explains how current social, organizational, and technological systems work and operates effectively within them
- Explains how a system's structures relate to goals; responds to the demands of the system, and functions within the formal and informal social and organizational systems.

¹⁶ Sandra G. Pritz is acknowledged for reframing the SCANS competencies for use with teachers the Department of Defense Dependents Schools.

Appendix E (continued)

DESCRIPTION OF INTERPERSONAL COMPETENCIES

Leadership

- Demonstrates competencies in leadership through the organization and coordination of group and individual tasks.
- Applies effective communication and listening skills to persuade and motivate others in order to accomplish goals.
- Demonstrates a sensitivity toward individual ideas and beliefs and will generate credibility through competence and integrity.

Group Dynamics

- Organizes tasks and assumes different responsibilities as a contributing group member
- Through positive interaction with respect for group diversity, negotiates, compromises, and reaches consensus when working toward a common goal
- Emphasizes process rather than product

Problem Solving

- Recognizes and defines the problem generates alternative solutions, chooses the best alternative, and implements a plan of action.
- Considers the consequences of these actions and makes informed decisions

Responsibility

- Initiates and or completes tasks consistently, and exhibits regular and timely attendance and is prepared to work and learn.
- Demonstrates a high level of effort and perseverance towards reaching goals.
- Takes care of materials and equipment, respects the property of others and completes tasks on time

Self Confidence

- Believes in own self worth and maintains a positive view of self
- Demonstrates knowledge of own personal strengths and limitations, displays initiative, is aware of impact on others, and responds to constructive criticism

Self Management

- Sets realistic goals, organizes resources, prioritizes tasks, and monitors own progress
- Evaluates information and motivates self in assessing progress toward completion of goals

Sociability

- Demonstrates understanding, friendliness, adaptability, empathy, and politeness in new and on-going group settings, and responds as the situation requires
- Cooperates as a team member, negotiates to arrive at a decision, demonstrates positive ways of solving conflicts, and relates to diverse groups

Integrity

- Consistently chooses an ethical course of action and displays a pattern of trustworthy behavior
- Respects the rights and property of others, accepts responsibility for own actions, and understands the impact of abiding by or breaking the rules and regulations

Personal Identification

- Demonstrates the ability to produce a personal portfolio of major achievements and accomplishments and has successfully produced a resume for employment purposes.

PowerPoint Presentations
for
Arts and Science Faculty
of
Perspective Teachers

- Contextual Learning: Connecting School-Life with Work-Life:
Information for Arts & Sciences Faculty

Crosswalk: Connecting School-life with Work-life:
Documents Useful to Arts & Sciences Faculty

SCANS: The Secretary's Commission on Achieving Necessary Skills:
Adapted for Arts & Sciences Faculty

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September 2000

PowerPoint Presentations For Arts & Science Faculty

Three PowerPoint Presentations have been adapted for arts and science faculty from a version created for education faculty use. Although we have made suggestions as to when to use each, you may find that the information in each of these presentations is useful in whole or in part in your class teaching as well as in educating your colleagues. Each of the presentations is animated so that pictures and text appear as the presenter clicks the mouse. Each has notes attached that include background information and the perspective of the authors.

1) Contextual Learning: Connecting School-Life with Work-Life PPP. Much is considered in this presentation. The presentation gets viewers to consider some interesting questions such as: what is school as different from work? Who goes to school and who decides this? How long does schooling last? When does schooling happen? Where does schooling take place? If schooling happens somewhere besides school, is it still schooling? Why do we need school? We can ask the same questions of work. Just exactly what is work? Who gets to define it? Just who works? Just when does work occur? And where? And of course why do we need to work? What happens when many people do not work? This presentation helps people consider contextualizing learning.

Children need to link what they are learning to the real work, the real world of work. Children need to see the real world and personal relevancy of what they are learning. We are all beginning to see a life long relationship with school and work. Children are employed in the work of school and employed people see that they must continue to learn. For children to link school life and real world life, their teachers need to see and present the connections. Teachers can better provide connections when their undergraduate arts and science professors included connections when they teach their

content classes. The arts and science faculty of colleges and universities throughout the U.S. play a significant role in producing teachers who are innovators and who connect with the community, parents of their students, business people, and community leaders.

The information provided in this presentation and in the end suggestions is that faculty of perspective teachers need to integrate contextual learning throughout programs, within specific courses, clinicals, and field experiences. Courses and programs need to provide perspective teachers with experiences in a variety of relevant workplace settings.

2) Crosswalk: Connecting School-life with Work-life. This presentation shows the relationship among the School-to-Work Preservice Teacher Education Programs Framework of Ohio, the Ohio Licensure Standards, the assessment criteria in Praxis III, and the National Board for Professional Teaching Standards. The presentation highlights contextual learning across the documents. With the advent of the Report Card for Ohio colleges and universities, it behooves all faculty to become knowledgeable of standards the their students must meet. This presentation shows the corresponding vision of all of these documents.

3) SCANS: The Secretary's Commission on Achieving Necessary Skills. There are two components identified by this commission as necessary for people to be successful in the work they choose to do: foundation skills and competency skills. These were identified because it was thought that employees have problems with knowing that these skills are necessary to their success. Too often employees attribute success to external factors instead of looking to their own intrinsic factors. The foundation skills include: the basic skills of reading, writing, arithmetic, listening, & speaking; the thinking skills of creative thinking, decision making, problem solving, seeing things in the mind's

eye, knowing how to learn, & reasoning; and the personal qualities of responsibility, self-esteem, sociability, self-management, & integrity. The competencies that individuals need to consider are how to use resources, information, technology, systems, and others. Further information on each is included in the PPP.

Arts and science faculty can help their learners consider how SCANS fits into students' ability to use the concepts under study. Too often students memorize what they think will be on a test and then forget the memorized information. At best the information is remembered but not applied. Students can no longer afford this kind of decontextualized learning exercise.

College and university faculty are important models for their students, especially students who will choose to teach. They model excitement about their field and about the content and concepts under study. They model ways of getting others to make sense of the relationship of the concepts to each other. They can model how the concepts under study relate to real live, jobs, and especially their own lives. If college and university faculty can facilitate their students' sense making about content concepts, then these same students will be better able to help their public school aged children make sense out of the content concepts under study.

Contextual Learning

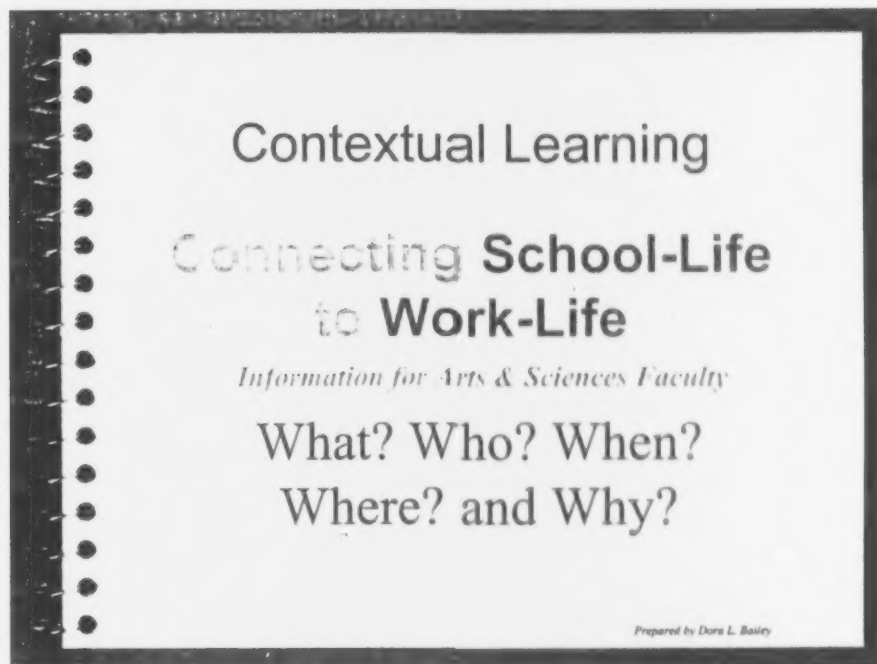
Connecting School-Life to Work-Life

Information for Arts & Sciences Faculty

What? Who? When?
Where? and Why?

Notes for this PowerPoint Presentation
are provided in this section

See the CD-Rom for the electronic version



Contextual learning is the concept under consideration.

It is a way to connect school-life and work-life. The intent of contextual learning is for people to obtain from society what they need to live their lives, and to do so in a meaningful and satisfying way (A Framework for Integrating School-to-Work into Preservice Teacher Education Programs).

Whenever one teaches a student, regardless of the age of that student, the concepts under discussion are learned best when they are contextualized in the real world.

Subconcepts that can be considered are the What, Who, When, Where and Why of school-life and work-life. See the next two slides for a further probing into these subconcepts.

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Opening Slide



What? Who? When?
Where? and Why?

We can ask ourselves some interesting questions about what school is as different from work. These questions are especially interesting about college students who are learning about work for their future.

We can ask...

- Who goes to school?
- Who decides?
- How long does schooling last?
- When does schooling happen?
- Where does schooling takes place?
- If it happens anywhere else, is it still schooling?

Of course we can ask ourselves...

- Why do we need schooling?

Actually teachers, especially college teachers, whose interest and enthusiasm serve as models of behavior, are "... critical to the success of any contextual learning. From integrating academic and work-based curricula to building collaborative relationships with employers and other partners, teachers play a key role in the effort to prepare students for further education and work." <http://www.stw.ed.gov/factsht/bull0897.htm>).

WORK-LIFE



What? Who? When?
Where? and Why?

This hospital plant (actually Toledo Hospital) is but one example of work places that can provide contextual learning for children; actually places like this, with such rich context, provide continual learning opportunities for their employees. Life long learning is already necessary in today's work world.

Think about the myriad of ways that people employ themselves here.

- What about advertising?
- What about art therapy?
- What else can you think of?

We can ask ourselves some interesting questions about when work begins as divided from school. We can help college students see how what they are learning connects with this and other work settings.

We can ask ourselves...

- Just exactly what is work?
- Who gets to define it?
- Just who works?
- Just when does work occur? And where?
- Why do we need to work?
- What happens when many people do not work?

Often many of America's young people leave school unequipped with skills they need to perform the jobs of a modern, competitive world economy. They often flounder in the labor market, wasting a decade or more unfulfilled. Employers are having difficulty finding workers who are adequately prepared for today's more demanding jobs. In addition, the whole notion of independent and small businesses is becoming more appropriate.

Because children have been traditionally shut off from real-live living earning, they don't know how to fit themselves into the earning-of-a-living scheme.

The traditional jobs of the past are unlikely to fit the needs of the world of tomorrow.

What is contextual learning?

- a means for helping students see meaning in classes
- requires partnerships OF

schools,



+

families,



+

communities,



+

and students.



As we enter the 21st century, linking learners with the authentic contexts of the real world is an important part of the legislated requirements. The School-to-Work Opportunities Act (signed by President Clinton on May 4, 1994) has allowed educators and business to investigate, experiment with, and refine all age children's learning in real contexts. It has provided an invitation to all sectors of a community to work together in new ways to meet shared and individual needs. It provided seed money to states and their partners (business, labor, government, education, and community organizations) to bring together efforts in education reform, worker preparation, and economic development to help prepare youth for the new and, as of yet to be created, high-wage, high-skill careers of today's global economy. STW challenged schools to build upon the good things they have already done to create a contextual way of learning for all of their students.

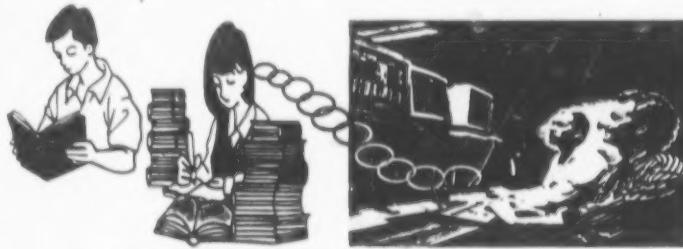
When students question teachers about reasons for certain required content and courses, it is because teachers have not helped students see how the content and course fit into their lives and into life in their work-based world. Students also do not see that all of us need to find a place for ourselves in society that the society will value so that they can survive. We need to help students see that emerging societal needs require higher levels of communication, science, mathematical, and technology skills than in the past. Thus, the STW system promoted:

1. A sustained system to integrate academic and career/technical instruction.
2. A classroom with academic instruction correlated with work-based learning.
3. A comprehensive K-12 integration of post-secondary and employment possibilities.
4. An expansion of opportunities for every learner.

An Approach to Learning

For all students

- *linking* learning with real work situations



- *making* transitions from school-life to
the world of work

Contextual learning is an integrated approach to learning for ALL students. It is based on the concept that education works best and is most useful for future careers when students learn in and apply what they learn to real-life, real- work situations.



This slide is meant to be busy – as is school and work. This slide works best in a PPP since it is animated. Continue clicking to bring in each animated piece. The elements appear one at a time. Text to go along with these appearances is below.

The very notion of people needing a transition from school-to-work is fading. Parents, teachers, and students of all ages are beginning to see students as employed in the work of school. In addition, employed people see that they must continue to learn to remain employed. (www.stw.ed.gov/general/whatis.htm).

1. When does a kid playing at baseball become a baseball player?
2. When does a kid experimenting with looking at samples through a microscope become an adult scientist looking at samples through a microscope?
3. When is practicing a violin a matter of schooling and when is it a matter of working?
4. When is ballet practice play and when is it professional work?
5. When is acting play and when is it serious?

Therefore, what we are going to consider through this presentation is the whole notion of accepting and encouraging people to see and enact a connection between school-life and work-life.

Changing Visions of Work

Mid-20th Century

Permanent
Stable
Advancement
Benefits
Health Care
Pension
Sense of Belonging

Early-21st Century

Temporary/Contingent
Unstable
Stagnation
Some Benefits Provisions
Some Health Care Provisions
Uncertainty About Pensions
Disaffection

Adapted from: VanHorn, Carl. *No One Left Behind*. The Report of the Twentieth Century Final Task Force on Retaining America's Workforce. 1996, p. 82

Consider how college and university faculty as well as teachers, who are used to mid-twentieth century work conditions, are to help upcoming workforce find their way. The challenge is great, yet college and university faculty have no choice. When people do not find something relevant to them, they no longer participate in the activity. We cannot afford to have masses of people turn away for higher education.

Problems that need to be addressed during the 21st century require the basic education of college. But, that education must connect with the world the students live in. The students must see how the concepts under study connect with the world at large. For students to learn the depth and breadth of information that they need in order to employ themselves, the connection must be made during the time of study, not 4 or more years later.

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The goals of contextual learning are to provide:

- real life contextual education
- open possibilities for prospective employment opportunities
- additional adult role models
- multiple post-secondary options for all students.

Externship experiences are designed to:

- develop young people's competence and confidence
- connect students to a range of post-secondary options (e.g., four-year college, two-year college, technical training, structured entry-level work along a career path)

Contextual learning has as its basis apprenticeships. However, apprenticeships were primarily used in the trades and only to pass on what was already known. The Federal School-to-Work effort has given this old model a new life. The notion of externships for school-aged children not only gets them to learn about what it takes to do existing jobs, but it also gets them to consider creating new jobs to meet upcoming needs. Externships in college-aged learners can be an even more powerful tool.

The goals of connecting school-life and work-life are to help children move into a work world that may not look like the work world as we know it. Regardless of how the future work world looks, workers in that world will need certain attitudes and skills. Children need experiences that are designed to develop young people's conceptions of work, competence, confidence, and connections to successful careers and citizenship. Teachers would be better able to help children if they had such experiences in college.

These experiences can be considered as the beginning of a pursuit of lifelong learning--where in the past young people often had no sense of connection for school and work, since the visions of work is changing.

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Ohio's Mission

OHIO SCHOOL-TO-WORK

"to ensure that every Ohio student graduates from high school with the knowledge and skills needed to succeed in the ever-changing world of work and is prepared for lifelong learning"

(www.stw.ed.gov/states/profiles/oh.htm)

The mission of Ohio STW is "to ensure that every Ohio student graduates from high school and beyond with the knowledge and skills needed to succeed in the ever-changing world of work and is prepared for lifelong learning" (<http://www.stw.edu.gov/states/profiles/oh.htm>). The goal is to develop in all children the competencies, confidence, and connections that can lead to successful work lives and responsible participation in the community (*A Framework for Integrating School-to-Work into Preservice Teacher Education in Ohio, 1999*).

For Ohio's STW system to succeed in preparing today's youth for tomorrow's employment and educational opportunities, education, business and industry, organized labor, community-based organizations, and non-profit organizations, along with both parents and students, must forge partnerships and relationships that enable students to integrate school-focused and work-focused learning and foster real-work applications of discipline-related principles and concepts. Key players in these partnerships are faculty members in Ohio's universities and colleges who are responsible for preparing initial and providing professional development for inservice teachers, counselors, and administrators for the public schools (*A Framework for Integrating School-to-Work into Preservice Teacher Education in Ohio, 1999*).

**School-life & Work-life
connections are designed to:**

- provide opportunities for all
K-12 students



- integrate the core curriculum
and real-life context



Continue clicking to animate in the pieces of this page. This gives the presenter time to have the audience discuss any of these elements

Since the STW Act was passed, the National STW Office has identified eight core elements that are essential to building school-to-work systems. These elements help states and local partnerships plan and implement STW as a long-term, systemic reform, rather than a patchwork of educational reforms or training programs. School-to-Work systems:

1. Provide Opportunities for All

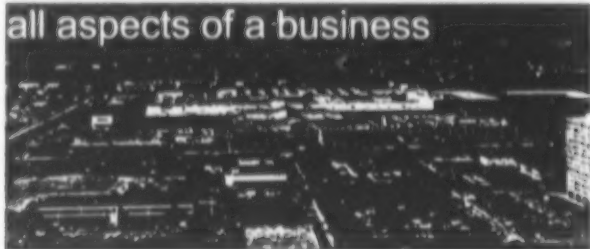
A primary objective is to build a system in which all students (regardless of abilities or disabilities) experience a rigorous, integrated sequence of career guidance, coursework, and work-based learning. Every student's learning experience should include activities that connect learning in the classroom with application of that learning beyond the classroom walls, particularly in the workplace.

2. Integrate STW Elements into the Core Curriculum

STW elements should be incorporated into the curricula of grades K-12 and post-secondary in progressive steps, building upon a foundation of rigorous academic standards. The school-based and work-based activities in an integrated curriculum provide a context for learning that grows richer and more challenging as the student matures.

School-life & Work life connections
are designed to (cont.):

- enhance professional development and communication
- explore all aspects of a business

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3. Enhance Professional Development and Communication

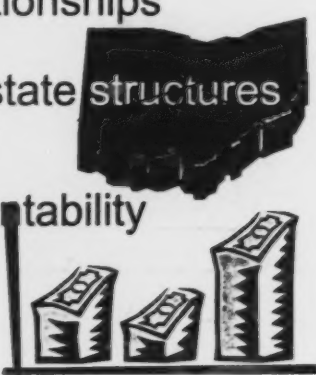
Contextual learning experiences can bring together a variety of education stakeholders throughout the community. All stakeholders need to communicate and negotiate expectations and needs to each other. To successfully implement externships, field trips, and work-site learning experiences, staff development and training are necessary for all partners, including school staff, parents, employers, employees, unions, and community-based organizations. Training activities are intended to develop the knowledge and ability of all stakeholders to work together to integrate curricula and provide students with a variety of work-based and community-based learning experiences that are related to school-based instruction.

4. Explore All Aspects of a Business

Experiences in real life work environments give students the opportunity to explore a variety of jobs in a business, industry or career cluster. This broad approach to work-based learning ensures that students are exposed to many aspects of an business & industry- including sales and marketing, management and finance, technical skills, labor and community issues, health and safety, and even environmental issues- in an integrated instructional system.

School-life & Work-life connections
are designed to (cont.):

- explore employer and employee relationships
- establish sub-state structures
- promote accountability



Continue clicking to animate in the pieces of this page. This gives the presenter time to have the audience discuss any of these elements

6. Encourage Employer and Labor Union Involvement

Employer and union involvement is essential for STW initiatives since both directly affect the great majority of employed people in this country. Employers and union leaders can be involved in STW in a number of ways—

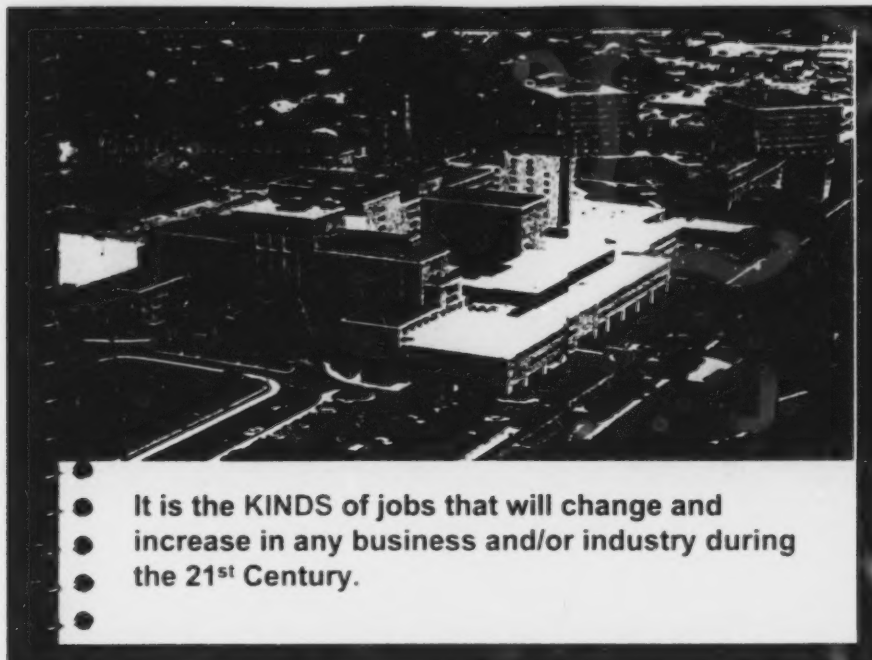
7. Establish Sub-State Structures

The strength of state efforts towards contextual learning depends, in large part, on how the state establishes its sub-state structure and how it ties in the STW effort. The intent is to achieve statewide coverage by building local partnerships and utilizing the sub-state infrastructure, Regional Development Centers, & County Service Centers.

8. Promote Accountability

All partners are individually and jointly accountable for the success of contextual learning. STW initiatives help spring education and business into partnership relationships. These efforts help stakeholders determine state and local progress in creating systems, identifying promising practices, and measuring student outcomes.

(<http://www.stw/ed/gov/factsht/bull1197.htm>).



- It is the KINDS of jobs that will change and
- increase in any business and/or industry during
- the 21st Century.
-
-

This is a hospital. Think of the number of people who work in this industry. Any hospital needs to have

- cooks,
- cleaners,
- lab people,
- electrical maintenance,
- personnel managers,
- facility administrators, etc.

These people outnumber the professional doctors and nurses. There are also the image builders, specialized people for specialized units, such as psychologists, and care givers and teachers for children patients. When a college professor teaches a course, s/he can directly refer to how a hospital uses the concepts s/he is teaching. This is contextualized learning. It goes beyond direct application into how a person who is paid to work or produce a product used said concepts.

●
●
● **School-life & Work-life Core Elements:**
●

- *• School-based learning* - classroom instruction based on high academics and business-defined occupational skill standards.
- *• Work-based learning* - career exploration, work experience, structured training and mentoring at job sites.
- *• Connecting Activities* - correlating classroom and work-based instruction, matching students with participating employers, training mentors, and building other bridges between school-life and work-life.
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Continue clicking to animate in the lines. This gives the presenter time to have the audience discuss any of these elements

School-based Learning - Classroom instruction is based on high academic and business-defined occupational skill standards. It integrates workforce preparation skills in all curriculum areas, integrates academic and vocational learning, and incorporates instruction in all aspects of work, business & industry.

Work-based Learning - Work-based learning occurs in workplace settings. It provides students with exposure to various aspects of a business through career exploration as well as visits to worksites, and practical experiences such as job shadowing, workplace mentoring, internships, youth apprenticeships and paid employment. The specific activities are designed to be developmentally appropriate.

Connecting Activities - Programs linking and integrating classroom and on-the-job instruction are accomplished through collaborative activities developed by schools, post-secondary institutions, employers, organized labor, and other community stakeholders. These activities include matching students with work-based learning opportunities, providing technical assistance to educators, providing workplace mentors, and the building of other bridges between school-life and work-life.

(www.stw.ed.gov/general/whatis.htm), (<http://www.tier.net/stc/whatis.htm>)

Related Principles:

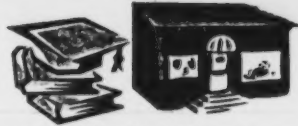


-  Learning can be enhanced when teachers focus on the child.
-  Applying knowledge and skills to meaningful contexts can increase learning, retention, interest.
-  Making connections between school learning and life learning can enhance learning, retention, and interest.
-  Teaching in authentic contexts can be a pervasive, powerful tool in improving children's performance

Continue clicking to animate in the lines. This gives the presenter time to have the audience discuss any of these elements

These are the related teaching and learning principles identified by the faculty and staff from six different universities on the team that wrote, “*A Framework for Integrating School-to-Work into Preservice Teacher Education in Ohio*” (1999).

More Related Principles:



- ☛ Connecting new learning to real life situations can bring relevance to students.
- ☛ Engaging in application of learning to real life situations can bring relevance to students.
- ☛ Meeting and working with a wide variety of people can allow students to better understand the concepts of diversity.
- ☛ Understanding the diversity of children can lead to understanding that all children can learn.

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(continuation of benefits from previous slide)

Benefits of Contextual Learning



Just as a family interacts with all ages present, so must school-life and work-life interact to benefit all stages of productivity development. All members of a family typically gain from this multi-age interaction. And so can people at all stages of knowledge and ability development in an area benefit from one another.

Every member of a society must contribute something to that society to earn his/her daily sustenance. College students as well as children can best learn about this when they are immersed in the work world as they are learning to learn and learning the tools they need in order to apportion.

Benefits of contextual learning:

- can raise academic achievement for all
- can reduce high school drop-out rates for all
- can improve attendance rates for all
- can enhance interest in school and learning for all

Continue clicking to animate in the lines. This gives the presenter time to have the audience discuss any of these elements

These are the benefits listed in the following web site:

(<http://www.stw.ed.gov/products/html/1058.htm>)

We cannot really know that these benefits are absolute. Our society is changing at a fast pace. We can educate people for the present and a possible future. This seems better than educating them for a world of work that existed in the past.

Present-day schools are more set up to prepare children for factories, management, and leadership – hence the tracking of children. However, the work world of the future that our children will be entering will probably require many more work avenues than society previously thought.

More benefits of contextual learning:

-  can improve graduation rates for all
-  can prepare all students for post high school learning settings and careers
-  can generate positive attitudes about work
-  can make school lessons & experiences more relevant

(continuation of benefits from previous slide)

Continue clicking to animate in the lines. This gives the presenter time to have the audience discuss any of these elements

Even more benefits of contextual learning:

- ✎ enjoys public support for career education in schools
- ✎ can increase opportunities for employment, resulting in better jobs
- ✎ can prepare and educate students for the workplace of the future
- ✎ can yield a higher employment rate

<http://www.stw.ed.gov/products/html/1058.htm>

(continuation of strategies from previous slide)

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The Role of Teacher Educators

- seek the ultimate goal of education
- prepare teachers for schools of the 21st Century
- produce teachers who are innovators and who connect with the community

Those involved with the preparation of new teachers at colleges and universities in Ohio seek the ultimate goal of education, which is the enrichment of the lives of children, by helping them gain the knowledge and skills they need to lead satisfying and productive lives. The quality of our students' lives depends on our students having the educational skills necessary to participate in their roles as citizen, worker, family member, and individual (*A Framework for Integrating School-to-Work into Preservice Teacher Education in Ohio, 1999*).

Arts and science faculty occupy an important position in their students' conception of their field of study. Many of their students will be teachers. The impression these students obtain of a field of study may determine the place that field will have in the learning lives of the children they will teach.

To prepare teachers for Ohio schools in the 21st century and beyond, initiatives such as the Standards for Ohio Schools, Goals 2000, S-T-W and Best Practices have evolved. These programs focus on simultaneous changes in several arenas, one of which is teacher education.

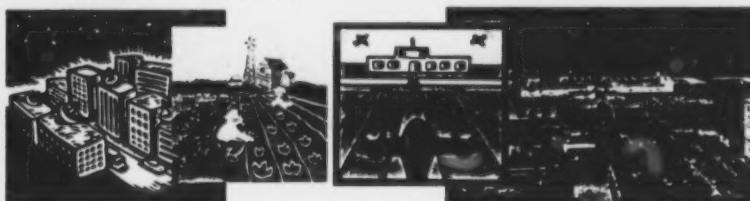
The arts and science faculty of colleges and universities throughout Ohio play a significant role in producing teachers who are innovators and who connect with the community, including parents of their students, business people, and community leaders.

These newly educated teachers will be expected to implement a curriculum that is directed toward meeting the needs of children and our society. They must be prepared to create learning environments that enable those needs to be met while setting high standards for all children.

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Integrating Contextual Learning into Teacher Education Programs

- integrate throughout a teacher education program (including the arts & science courses) and within specific courses, clinicals, and field experiences.
- provide students with experiences in a variety of relevant workplace settings (including in the arts & science courses);



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All faculty in colleges and universities play pivotal roles in the conceptualization of their content fields. It behooves all of us to continue to figure out ways to make our fields attractive to learners, students. There is room for all of our passions.

These strategies were identified in *A Framework for Integrating School-to-Work into Preservice Teacher Education in Ohio (1999)* that was created by a team of faculty representing multiple universities in the state. These strategies appropriately apply to contextual learning.

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Integrating Contextual Learning

- provide all college and university students with opportunities to discover through observation, actual experiences and interviewing, how:
 - academic content knowledge and skills are applied in the workplace.
 - workplace problems can serve as a basis for subject matter content.
 - important positive attitude and work ethics are important for success in the workplace.
 - SCANS competencies are applied in the workplace. (See SCANS PPP)

Continue clicking to animate in the words and pictures. This gives the presenter time to have the audience discuss any of these elements.

It is suggested that the audience be encouraged to contribute several examples in each area before moving to the next suggestion.

SCANS comes from *What Work Requires of School: A Scans (Secretary's Commission on Achieving Necessary Skills) Report for America 2000* (1991). It includes foundation skills such as the basic skills of reading, writing, arithmetic, listening, and speaking. The thinking skills of creative thinking, decision making, problem solving, seeing things in the mind's eye, knowing how to learn, and reasoning are also included. Personal qualities such as responsibility, self-esteem, sociability, self-management, and integrity are also considered foundation skills. The SCANS also delineates what 'work' requires schools to be about so that employers can have competent workers. These competencies are the ability to identify, organize, plan and allocate resources; work with others; acquire and use information; understand complex inter-relationships, and work with a variety of technologies.

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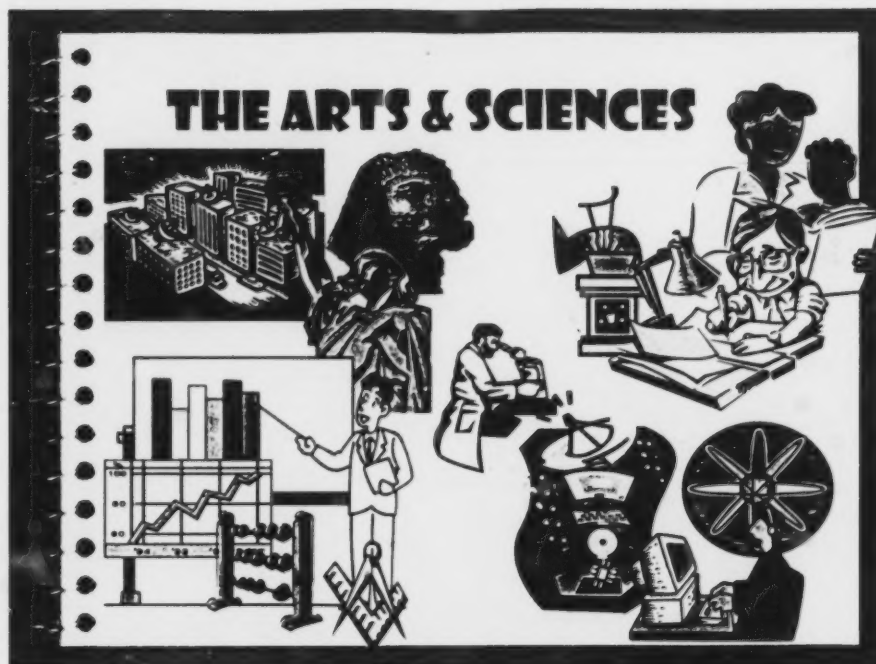
Integrating Contextual Learning

- provide an interdisciplinary approach for students to learn concepts, principles, and practices that are contextualized.
- provide students with a variety of suggestions for motivating their future students, including showing relationships between content being learned and careers/the workplace.
- model concepts, principles, and practices within all programs by building and using partnerships.

A Framework for Integrating STW into Preservice Teacher Education, Ohio, 1999

Continue clicking to animate in the words and pictures. This gives the presenter time to have the audience discuss any of these elements.

“STW” was removed and “contextual learning” or “contextualized” replaced STW.



These images refer to

- 1) Social Studies,
- 2) Language Arts,
- 3) Science, and
- 4) Mathematics.

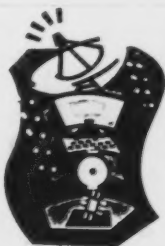
These are the major areas of study that people going into education can consider.

Of interest to educators are also Music, Art, Drama, Business, etc. But for the purposes of a succinct representative perspective on contextual learning, we are only including the four major categories.

This is the age of standards, and all of the content areas have developed standards for student performance. Included in those standards are many references to application and contextual learning. Ohio has created its own Model competency-Based Program for Social Studies, Math, Language Arts, and Science.

Integrated Science Standards

Ohio's Model Competency-Based Program



***Strand One - Scientific Inquiry
Applications***

***Strand Two - Scientific Knowledge
Applications***

***Strand Three - Conditions for
Learning Science Application***

***Strand Four - Applications for
Science Learning***



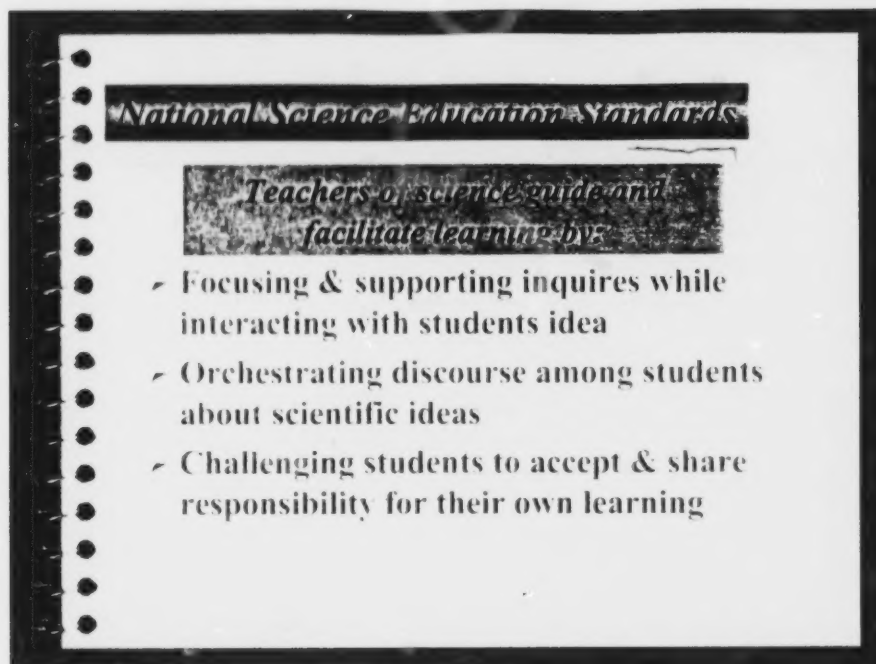
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Strand One includes understanding hazardous conditions and associated risks for chemicals, bacteria, etc. such as in homes and public areas. This could involve constructing and testing models of physical, biological, social, and geological systems. Research using surveys, observational instruments, and other methods are expected.

Strand Two includes understanding scientific systems, stressors on those systems, and changes possible within those systems. Demonstration of understanding could include formulating models and hypotheses that can be used to explain the interactions of components within technological and ecological systems. Interpretations of the relationship between energy exchange and the interfaces between components within systems are likely projects.

Strand Three includes working as a contributing member of a collaborative research group using technology to uncover, document, and communicate scientific ideas. Students are asked to develop possible courses of action in response to scientific issues of local and global concern after drawing conclusions from research. Attention is paid to research design, performance of the research, and the results obtained.

Strand Four includes writing, following, modifying, and extending instructions as products are created, inferences are made, and conclusions are drawn using databases, spreadsheets, and other technologies. Students will be asked to predict various scenarios and propose solutions to community issues using scientific information.



Continue clicking to animate in the words and pictures. This gives the presenter time to have the audience discuss any of these elements.

Prospective teachers in 1st- and 2nd-year college and university students need to participate with professors as they focus on their inquiries. If they don't, they will not know how to do this with their own students. It is the content area teacher who can best model appropriate behavior. How can future teachers understand how to orchestrate discourse among students about scientific ideas if they have not themselves been a part of this during their own college learning?

All of these could be applied to the other content areas as well. As we go through these, think of ways each of these apply to another content area as well.

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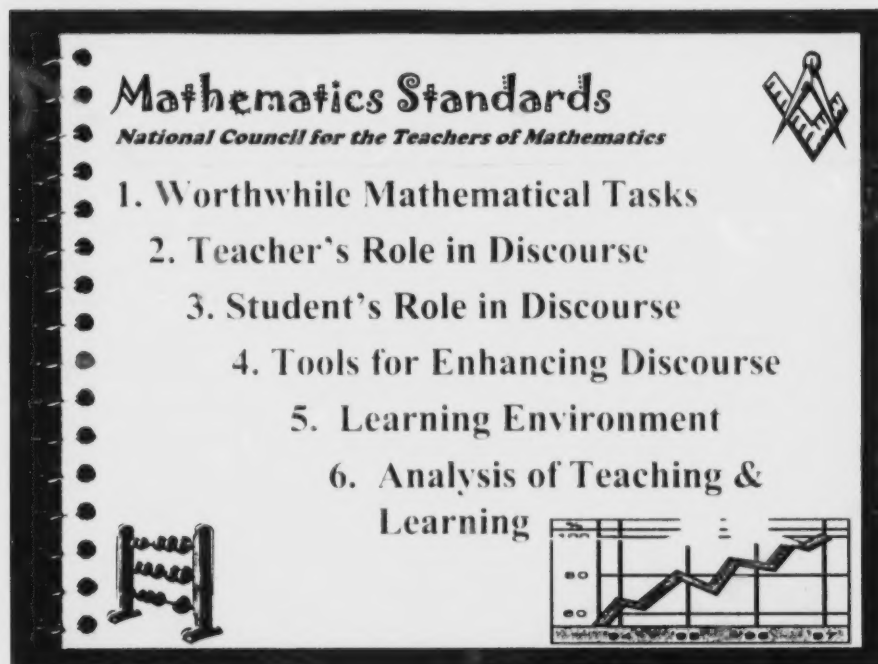
National Science Education Standards

- Recognizing & responding to student diversity in learning and encouraging all to participate fully in science learning.
- Encouraging and modeling the skills of scientific inquiry, as well as the curiosity, openness to new ideas and data, and skepticism that characterize science.^(p.32)

Continue clicking to animate in the words and pictures. This gives the presenter time to have the audience discuss any of these elements.

Too often teachers in public school years dictate the skills of scientific inquiry and expect the students to expertly follow the steps. This type of teaching, unfortunately, was modeled to these teachers in their college classes by their college teachers. Another concept lost in too many college courses is curiosity. Too many times introductory courses are treated as "no need to be curious; all knowledge is already known; just memorize it so you can get to the really good stuff." This attitude also eliminates any development of skepticism and questioning which is at the core of scientific endeavors.

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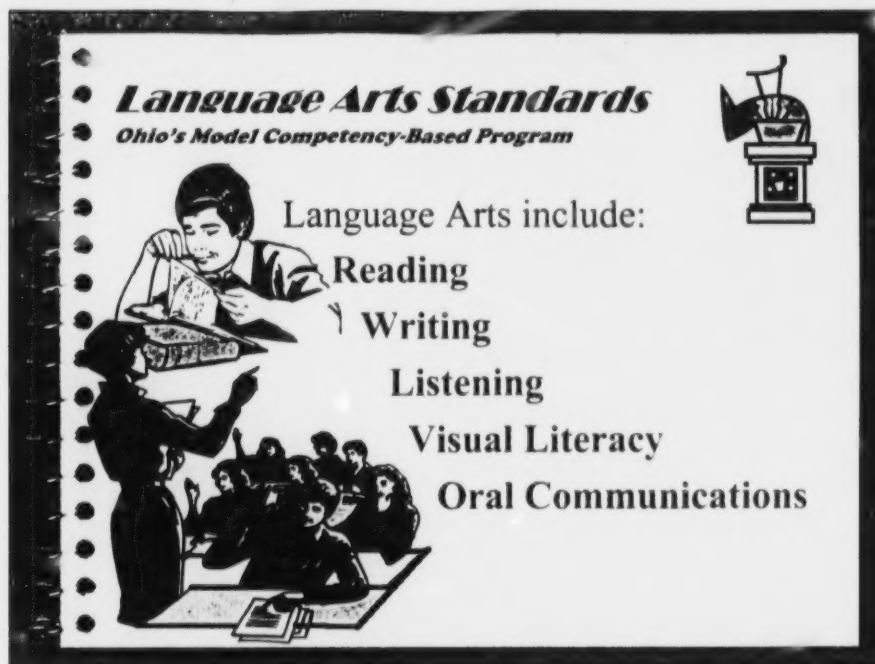
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The standards for teaching are based on four assumptions about the practice of mathematics teaching:

- 1) The goal of teaching mathematics is to help all students develop mathematical power.
- 2) What students learn is fundamentally connected with how they learn it.
- 3) All students can learn to think mathematically.
- 4) Teaching is a complex practice and hence not deducible to recipes or prescriptions.

Traditional teaching would teach the mathematical concept of perimeter by asking, "Find the area and perimeter of each of the rectangles." Contextual teaching requires the teacher to analyze the content and how to approach it, and s/he considers how it connects with other mathematical ideas. This same concept could be experienced by the learner in the following task. "Suppose you had 64 feet of fence with which you were going to build a pen for your large dog, Bones. What are some different pens you can make if you use all the fencing? What is the pen with the least play space? What is the biggest pen you can make - the one that allows Bones the most play space? Which would be best for running?" p. 28

"This task can engage students intellectually because it challenges them to search for something. Although accessible to even young students, the problem is not immediately solvable. Neither is it clear how best to approach it. A question that students confront as they work on the problem is how to determine that they have indeed found the largest or the smallest play space. Being able to justify an answer and to show that a problem is solved are critical components of mathematical reasoning and problem solving." p.28 (See National Council of the Teachers of Mathematics Professional Teaching Standards/Teaching for more ideas).



Continue clicking to animate in the words and pictures. This gives the presenter time to have the audience discuss any of these elements.

There are performance objectives at each grade level. Woven throughout the objectives are contextual references. For example, part of the Grade 6 Performance Objective #2: The learner will be presented with a nonfiction selection of at least 500 words which has topical and structural integrity and is at an appropriate level of instruction, demonstrate an integrated understanding of the major concepts, the evidence that supports those concepts, the possible application for the concepts, and the possible purposes the selection might serve as evidenced in part by the capacity to f) predict the most probable outcome in a particular circumstance; h) specify at least one purpose the author might have for writing the selection; j) & identify any author bias/slant/view stated about the passage or topic.

The above closely relates to the Grade 11 Performance Objective #2: The learner will be presented with appropriate non-fictional selections, demonstrate comprehension, as evidenced in part by capacity to b) differentiate statements based on fact from statements based on opinion; c) make predictions about whether certain information is likely to be included in material; d) compare and contrast facts and events from one selection with facts and events from other selections.

Our future teachers need to learn how to do these things themselves before they will feel able to help children learn how to do these things. English classes need to consider the kinds of tasks that they ask their learners to do. These objectives imply an ability to think while reading instead of an ability to memorize someone else's interpretations.

For further examples see the Ohio Model.



Social Studies Standards

Ohio's Model Competency-Based Program
Six Strands

1. *American Heritage*
2. *People in Societies*
3. *World Interactions*
4. *Decision Making & Resources*
5. *Democratic Processes*
6. *Citizenship Rights & Responsibilities*

Continue clicking to animate in the words and pictures. This gives the presenter time to have the audience discuss any of these elements.

Each of these strands has benchmarks in each grade level according to the Ohio Model. College & university students need to know the content and resources for the content in order to help their future pupils learn. College professors can help freshmen and sophomores find meaning in each of these six strands.

For example, in the Grade Four Instructional Objectives under the Democratic Processes are the objectives of: 1) identify the purposes of state government, 2) link examples of governmental actions with the purposes of state government, 3) explain the basic function of each branch of local and state government, & 4) explain how the states and their local governments have principal responsibility for domestic functions in the United States.

At the sixth-grade level the objectives for the Democratic Processes include: 1) distinguish among the characteristic and cite examples of monarchical, democratic, and dictatorial types of government, 2) explain the major priorities/aims served by monarchical, democratic, and dictatorial types of government, & 3) discuss how policies and actions of government can promote the public good.

For further examples of these strands' objectives, see the Ohio Model. However, it can be seen from the example above that memorization of facts is not enough learning for today's pupils. Learners need to be able to apply the concepts under study: thus learners need to be able to create meaning from what they are learning. They need to connect what they are learning to their own lives.



Educators are called upon to do more and more with less and less. The STW effort served as a catalyst for contextual learning and partnerships where all partners want all learners to become successful, productive, and happy adults. This is not an effort that asks for more, but an effort that takes what schools and society already have and works with partners to link school learning with the real world. Although this process can start in the K-12 arena, it is most important in college. This is where students are seriously focusing on a particular career and are paying particular attention to the modeling around them about said career. We must explore with our partners, including students, how to transfer our school experiences into the real world prior to moving into a career. The 21st century is just beginning. Our college students of today will be teaching K-12 children who will have many opportunities which will span most of the century. Will the teachers be prepared to teach children how to enter a future that we cannot envision?

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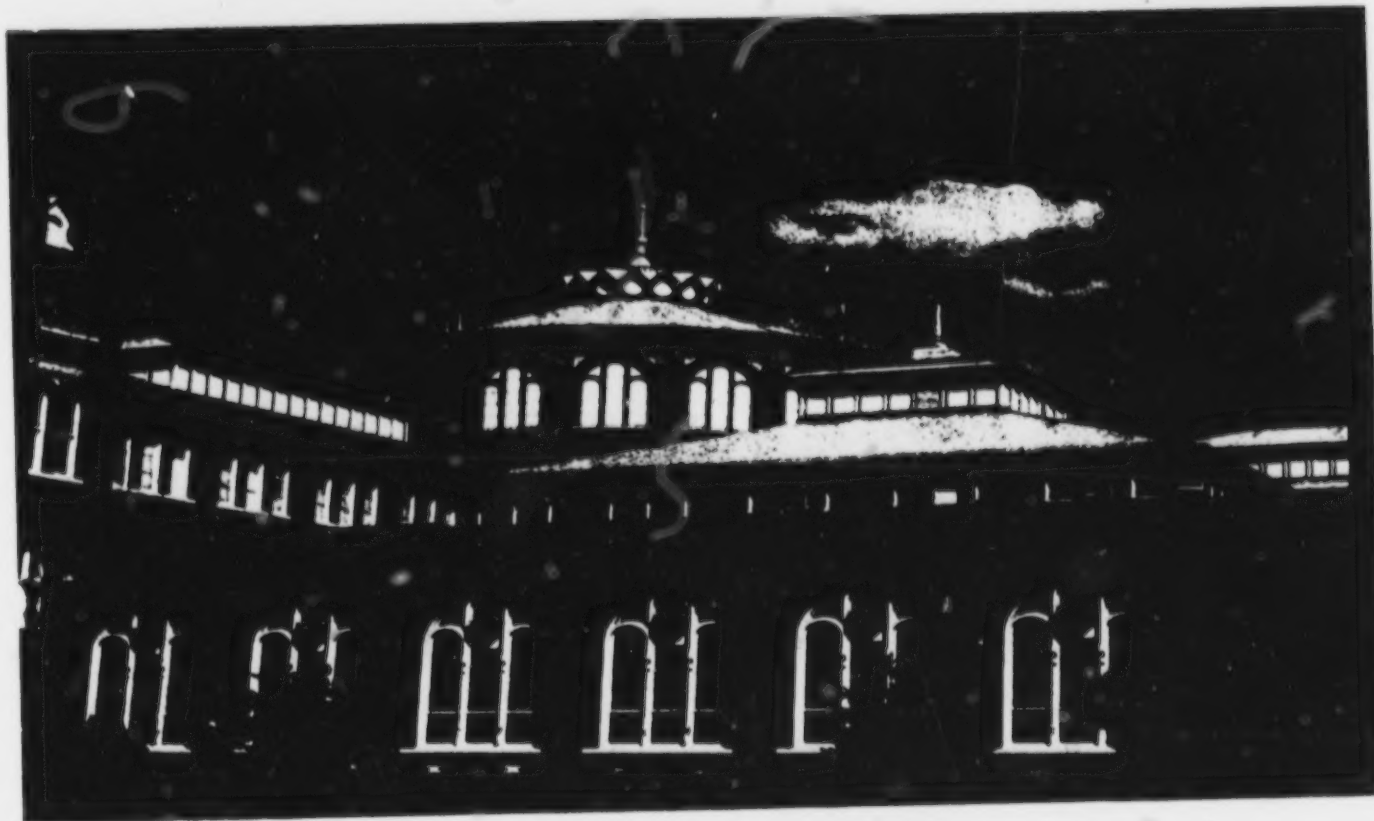
Contextual Learning

Connecting School-Life to Work-Life

Information for Arts & Sciences Faculty

What? Who? When?
Where? and Why?

Prepared by Dora L. Bailey



What? Who? When?
Where? and Why?

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WORK-LIFE



What? Who? When?
Where? and Why?

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What is contextual learning?

- a means for helping students see meaning in classes
- requires partnerships OF

schools,

families,

communities,

and students.



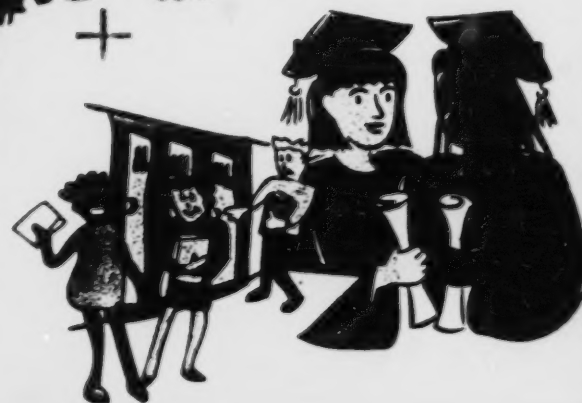
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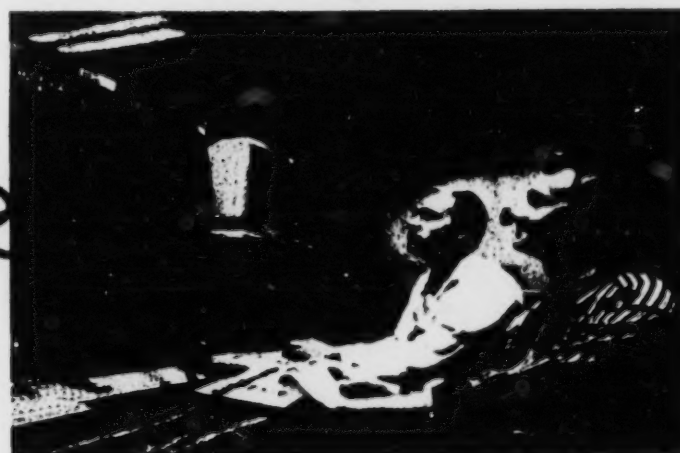


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An Approach to Learning

For all students

- *linking* learning with real work situations



- *making* transitions from school-life to
the world of work

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School-life connected to work-life



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Changing Visions of Work

Mid-20th Century

Permanent
Stable
Advancement
Benefits
Health Care
Pension
Sense of Belonging

Early-21st Century

Temporary/Contingent
Unstable
Stagnation
Some Benefits Provisions
Some Health Care Provisions
Uncertainty About Pensions
Disaffection

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Federal Mission



School-to-Work

The goals of contextual learning are to provide:

- **real life contextual education**
- **open possibilities for prospective employment opportunities**
- **additional adult role models**
- **multiple post-secondary options for all students.**

Externship experiences are designed to:

- **develop young people's competence and confidence**
- **connect students to a range of post-secondary options (e.g., four-year college, two-year college, technical training, structured entry-level work along a career path)**

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Ohio's Mission



“to ensure that every Ohio student graduates from high school with the knowledge and skills needed to succeed in the ever-changing world of work and is prepared for lifelong learning”

(www.stw.ed.gov/states/profiles/oh.htm)

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School-life & Work-life connections are designed to:

- provide opportunities for all
K-12 students



- integrate the core curriculum
and real life context

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Mathematics

Health

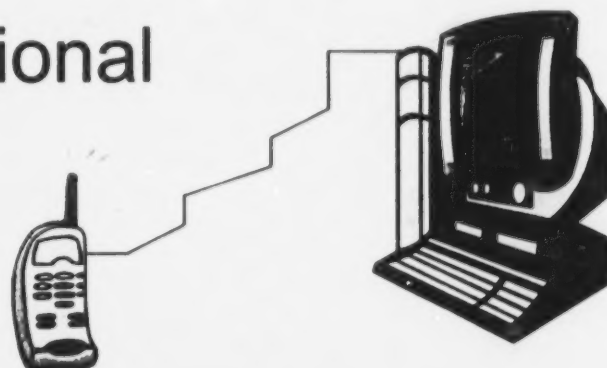
Music

Reading

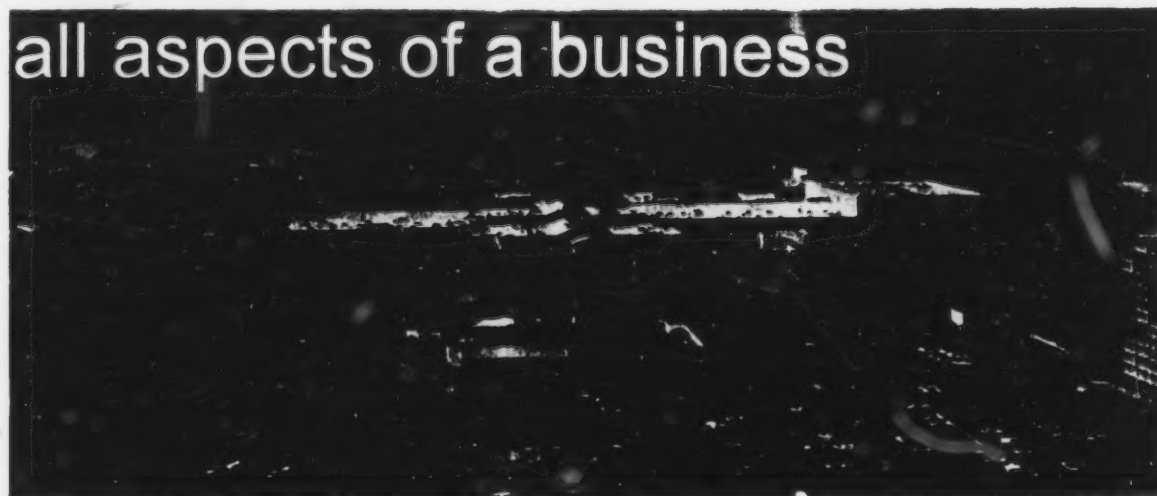
History

**School-life & Work life connections
are designed to (cont.):**

- enhance professional development and communication



- explore all aspects of a business



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School-life & Work-life connections
are designed to (cont.):



• support career majors

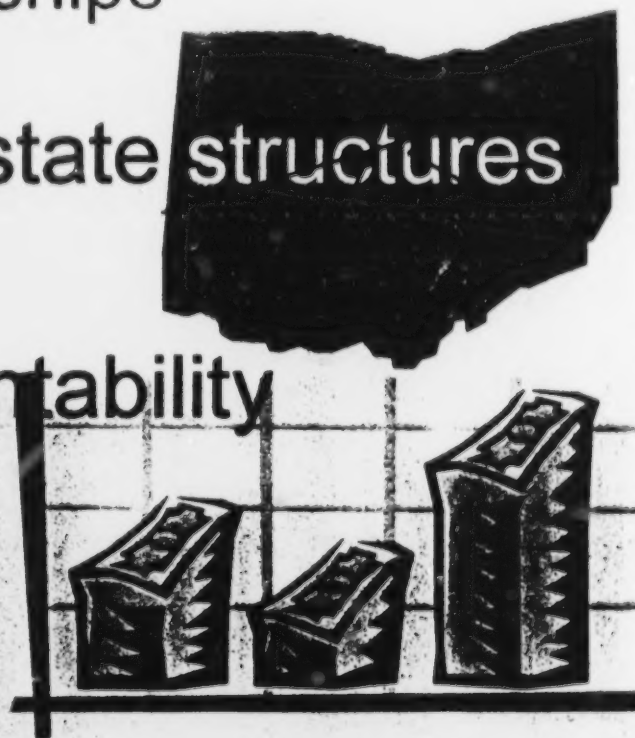


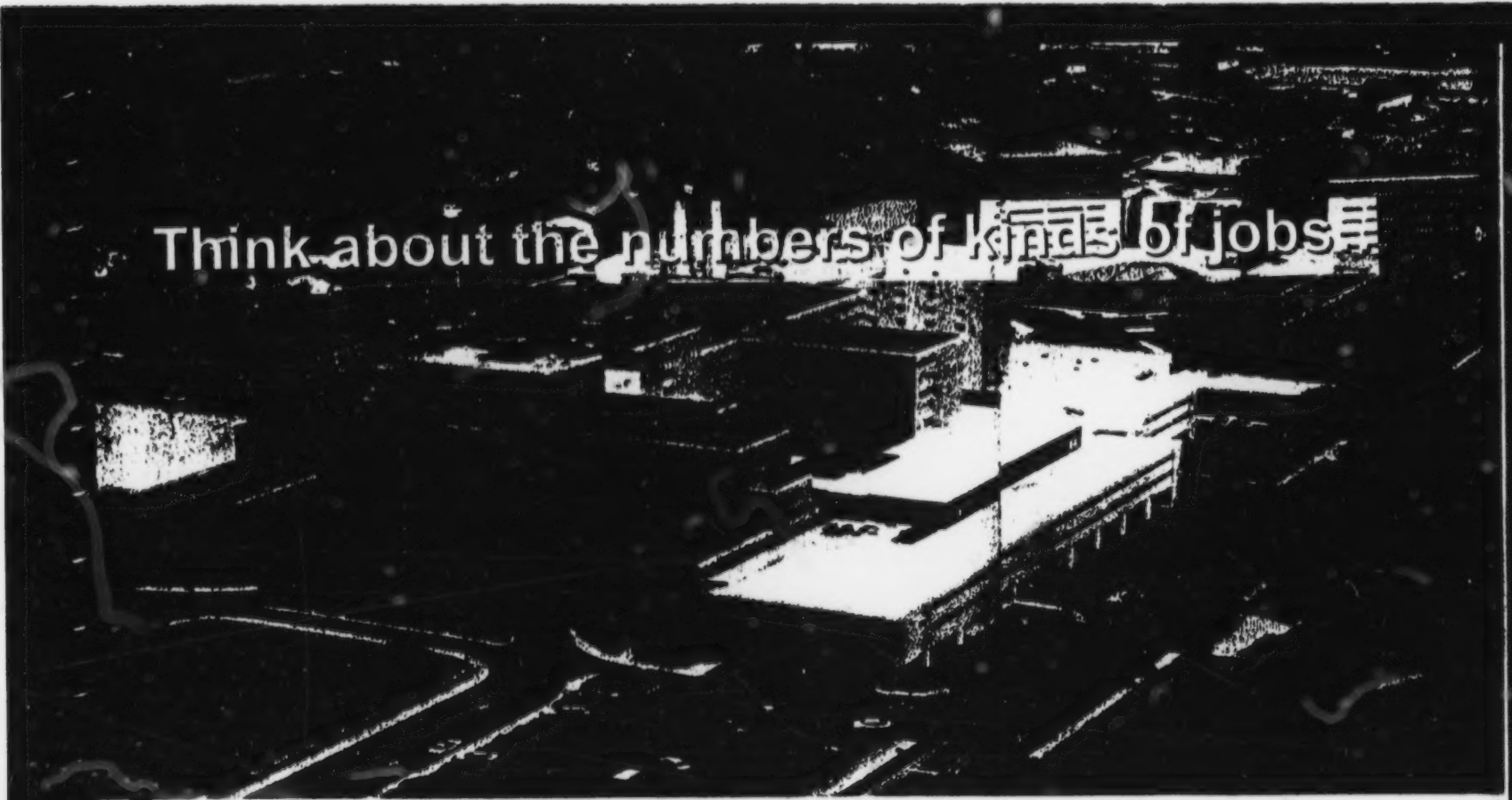
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**School-life & Work-life connections
are designed to (cont.):**

- explore employer and employee relationships
- establish sub-state structures
- promote accountability

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Think about the numbers of kinds of jobs

- It is the KINDS of jobs that will change and increase in any business and/or industry during the 21st Century.

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School-life & Work-life Core Elements:

- *School-based learning* - classroom instruction based on high academics and business-defined occupational skill standards.
- *Work-based learning* - career exploration, work experience, structured training and mentoring at job sites.
- *Connecting Activities* - correlating classroom and work-based instruction, matching students with participating employers, training mentors, and building other bridges between school-life and work-life.

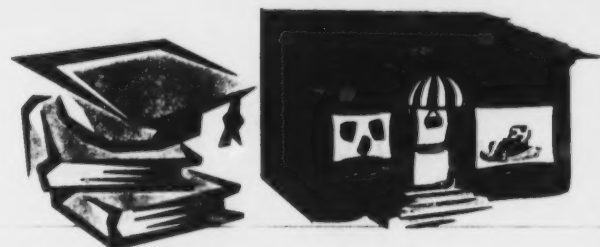
Related Principles:



- 📖 Learning can be enhanced when teachers focus on the child.
 - 📖 Applying knowledge and skills to meaningful contexts can increase learning, retention, interest.
- 📖 Making connections between school learning and life learning can enhance learning, retention, and interest.
 - 📖 Teaching in authentic contexts can be a pervasive, powerful tool in improving children's performance

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More Related Principles:



-  Connecting new learning to real life situations can bring relevance to students.
-  Engaging in application of learning to real life situations can bring relevance to students.
-  Meeting and working with a wide variety of people can allow students to better understand the concepts of diversity.
-  Understanding the diversity of children can lead to understanding that all children can learn.

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Benefits of Contextual Learning



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Benefits of contextual learning:

can raise academic achievement for all

can reduce high school drop-out rates for all

can improve attendance rates for all

can enhance interest in school and learning for all

More benefits of contextual learning:

-  can improve graduation rates for all
-  can prepare all students for post high school learning settings and careers
-  can generate positive attitudes about work
-  can make school lessons & experiences more relevant

Even more benefits of contextual learning:

 enjoys public support for career education in schools

 can increase opportunities for employment, resulting in better jobs

 can prepare and educate students for the workplace of the future

 can yield a higher employment rate

(<http://www.stw.ed.gov/products/html/1058.htm>)

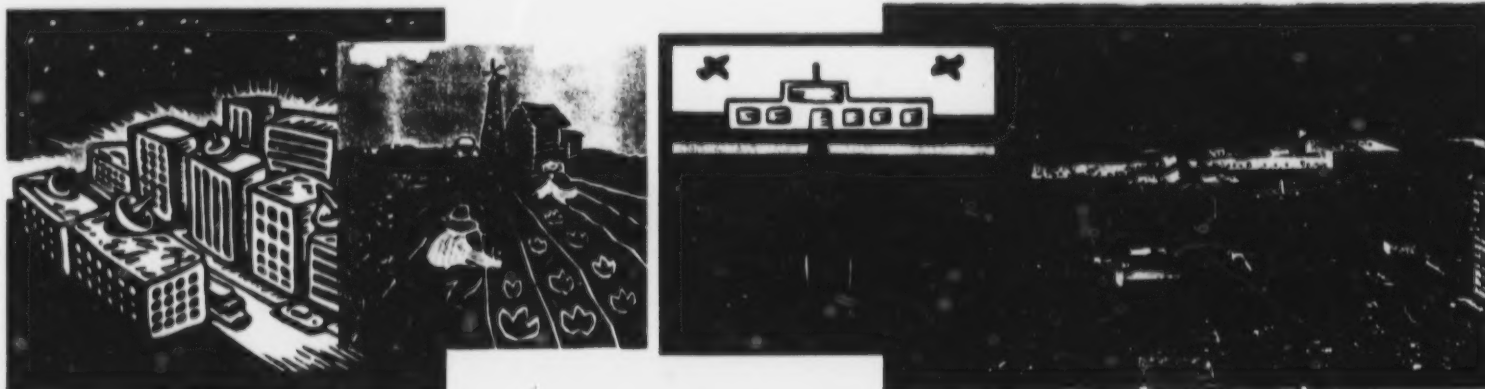
The Role of Teacher Educators

- seek the ultimate goal of education
- prepare teachers for schools of the 21st Century
- prepare teachers who can design and deliver relevant classroom experiences to learners
- produce teachers who are innovators and who connect with the community

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Integrating Contextual Learning into Teacher Education Programs

- integrate throughout a teacher education program (including the arts & science courses) and within specific courses, clinicals, and field experiences.
- provide students with experiences in a variety of relevant workplace settings (including in the arts & science courses).



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Integrating Contextual Learning

- provide all college and university students with opportunities to discover through observation, actual experiences and interviewing, how:
 - academic content knowledge and skills are applied in the workplace.
 - workplace problems can serve as a basis for subject matter content.
 - important positive attitude and work ethics are important for success in the workplace.
 - SCANS competencies are applied in the workplace. (See SCANS PPP)

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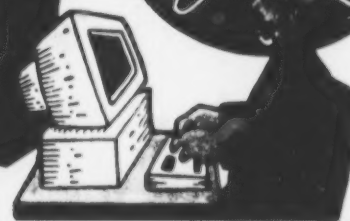
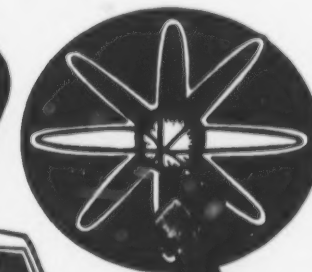
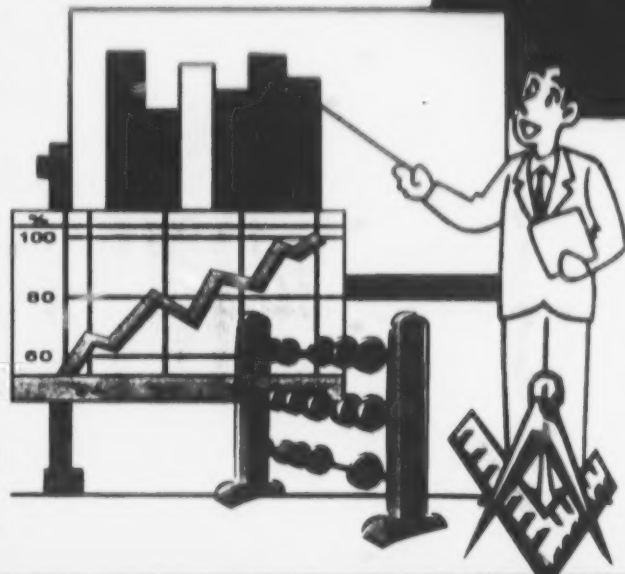
Integrating Contextual Learning

- provide an interdisciplinary approach for students to learn concepts, principles, and practices that are contextualized.
- provide students with a variety of suggestions for motivating their future students, including showing relationships between content being learned and careers/the workplace.
- model concepts, principles, and practices within all programs by building and using partnerships.

A Framework for Integrating STW into Preservice Teacher Education, Ohio, 1999

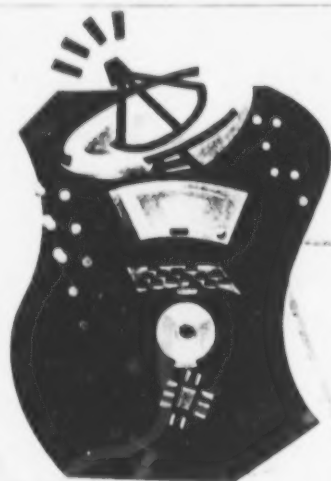
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THE ARTS & SCIENCES



Integrated Science Standards

Ohio's Model Competency-Based Program



***Strand One- Scientific Inquiry
Applications***

***Strand Two- Scientific Knowledge
Applications***

***Stand Three- Conditions for
Learning Science Application***

***Strand Four- Applications for
Science Learning***



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National Science Education Standards

*Teachers of science guide and
facilitate learning by:*

- **Focusing & supporting inquires while
interacting with students idea**
- **Orchestrating discourse among students
about scientific ideas**
- **Challenging students to accept & share
responsibility for their own learning**

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National Science Education Standards

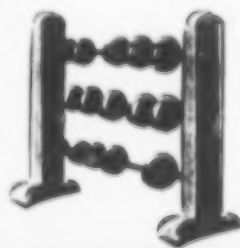
- Recognizing & responding to student diversity in learning and encouraging all to participate fully in science learning.
- Encouraging and modeling the skills of scientific inquiry, as well as the curiosity, openness to new ideas and data, and skepticism that characterize science.^(p.32)

Mathematics Standards

National Council for the Teachers of Mathematics

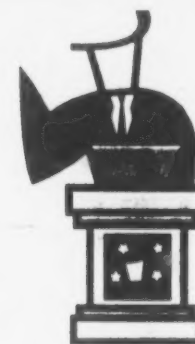


1. Worthwhile Mathematical Tasks
2. Teacher's Role in Discourse
3. Students' Role in Discourse
4. Tools for Enhancing Discourse
5. Learning Environment
6. Analysis of Teaching & Learning



Language Arts Standards

Ohio's Model Competency-Based Program



Language Arts include:

Reading

Writing

Listening

Visual Literacy

Oral Communications





Social Studies Standards

Ohio's Model Competency-Based Program *Six Strands*

1. *American Heritage*
2. *People in Societies*
3. *World Interactions*
4. *Decision Making & Resources*
5. *Democratic Processes*
6. *Citizenship Rights & Responsibilities*



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When all join together,



*the story
really*



*- with the leverage of
partnerships with students,
teachers, parents and the
real world.*



Crosswalk

Contextual Learning

A Corresponding Vision

Documents Useful to Arts & Sciences Faculty

Notes for this PowerPoint Presentation
are provided in this section

See the CD-Rom for the electronic version

Contextual Learning

(A Primer for Arts & Science Faculty)

Connecting School-life with Work-life

A Corresponding Vision

Crosswalking through:

All faculties who teach preservice teachers are responsible to teach in a manner that models accomplished teaching. College and university faculty are the implicit and explicit models for our future teachers. No longer can Arts and Science faculty only be concerned with teaching content. They must also be concerned with how they teach that content and how they make that content relevant for the student, how they connect content to the real world.

The four documents referred to in this crosswalk are: Praxis III, Ohio Licensure Standards, National Board for Professional Teaching Standards (NBPTS), and School-to-Work Preservice Teacher Education Programs Framework. All of these documents and assessments represent a harmonious perspective on teaching and learning. This crosswalk demonstrates the correspondence.

The first document referred to is the Praxis III, which is part of an Educational Testing Service (ETS) Professional assessment for beginning teachers. There are three assessments: Praxis I: Academic Skills Assessments, Praxis II: Subject Assessments, and Praxis III: Classroom Performance Assessments. Praxis I consists of measures of basic proficiency in reading, writing, and mathematics, which have been identified as needed by a beginning teacher in these areas. Praxis II consists of measures of knowledge of specific academic subjects or fields that prospective teachers acquire in their academic preparation. Praxis III combines in-class assessment of teaching performance with written documentation of pre- and post observation interviews about teaching. The Universities and Colleges in the state of Ohio use all three of the Praxis series.

The second document that is referred to is the Ohio Licensure Standards which were developed to guide colleges and universities as they prepare preservice teachers to be able to pass the Entry Year Assessment, which is Praxis III at this point in time. The State identifies 10 areas in which teachers need to create success for their students. The evaluator must consider each of the ten areas in the light of student success: subject matter, student learning, diversity of

learners, planning instruction, instructional strategies, learning environment, communication, assessment, professional development, and student support.

The third document that is referred to is the NBPTS five core propositions. The mission of the NBPTS is to establish high and rigorous standards for what accomplished teachers should know and be able to do and to advance related education reforms for the purpose of improving student learning in American schools. Although each field has created its own set of standards, each set revolves around five core propositions; 1) teachers are committed to students and their learning, 2) teachers know the subjects they teach and how to teach those subjects to students, 3) teachers are responsible for managing and monitoring student learning, 4) teachers think systematically about their practice and learn from experience, and 5) teachers are members of learning communities.

The last piece in the crosswalk is the Framework for Integrating School-to-Work into Preservice Teacher Education. This document was written by a coalition of faculty and staff from six universities and colleges as well as staff from professional development centers. The document represents their view of their roles and responsibilities in paving the way for P-14 children to move from school centered lives to work centered lives. The document sets the tone for work centered lives to include avocation, interest, passion, and hobby as well as entering the work force. The document iterates teaching and learning principles that preservice teachers need to demonstrate. There are 8 such principles: 1) children's learning is enhanced when teachers focus on the child, 2) children learn more and retain it longer when they apply their knowledge and skills to meaningful contexts, 3) an important role of the teachers is to help children make connections, 4) authentic (contextual) teaching is the pervasive, powerful tool in improving children's performance, 5) children learn best when new ideas are connected to what they already know and have experienced, 6) children learn best when they are actively engaged in applying and testing their knowledge and using real-world problems, 7) all children can learn, and 8) prospective teacher will be prepared to teach effectively across a variety of disciplines, culture, races, and aptitude levels.

Contextual Learning

A Corresponding Vision

Documents Useful to Arts & Science Faculty

Crosswalk through:

PRAXIS III	Ohio Licensure Standards	National Board For Professional Teaching Standards	Connecting School Life to Work Life
Teacher Performance Assessments	10 Performance Areas	Five Core Propositions	S-T-W Preservice Teacher Education Programs Framework
Assessment Criteria			Teaching & Learning Principles and Outcomes

As we move into the 21st century, we can look to the kind of future our children will have. The four documents listed here can provide useful information to college and university professors as they teach young people who will one day teach our children. Praxis III is the means that the state of Ohio will assess the competence of beginning teachers. Teachers must pass this in order to become licensed. This assessment looks at both content and pedagogy. Before teachers get to this assessment they must pass the Praxis II which has one section in their content area and one on pedagogy. A student has to pass this in order to receive a temporary 2-year license so that s/he can prepare with real students for the Praxis III. The Ohio Licensure Standards guided the Praxis II & III as well as teacher preparation programs in colleges and universities. The NBPTS is for practicing teachers who are already licensed and sets standards for accomplished teaching. The STW Preservice Teacher Framework was written by a consortium of college and university professors in Ohio to emphasis the connection of schooling and working.

A good percentage of the people that A & S professors have in their classes will eventually be teachers. It is advised that all educators of educators consider how they teach these people. The way we teach our future teachers is likely to be the way they will teach the children.

These four documents give evidence for contextual learning. This document is a quick PPP Crosswalk through the four documents. For further information on the content and intent of the four document, see these publications.

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Teacher Performance PRAXIS III	Ohio licensure Performance Areas	NBPTS	STW Preservice Framework
Domain A: Organizing Content Knowledge for Student Learning		Proposition Two: Teachers know the subjects they teach and how to teach those subjects to students.	
A1. Become familiar with relevant aspects of students' background, knowledge, & experience.	✓ Understands how students learn and develop, & creates opportunities for each student's academic development. ✓ Understands differences in how students learn & provides instruction to accommodate such diversity. ✓ Plans instruction based on knowledge of subject matter, of students, & of curriculum goals & models.	2.1 Teachers generate multiple paths to knowledge.	✓ Children's learning is enhanced when teachers focus on the child. ✓ All children can learn. The wide diversity of learners requires an understanding of a variety of culture, races, aptitude levels, & interests.

2

Arts and Science faculty are becoming concerned with how they teach content, how they make content relevant for the student, and how they connect content to the real world.

Let's look at the first two documents highlighted in the first row. The reference in green is Praxis III, which is part of an Educational Testing Service's (ETS) professional assessment for beginning teachers. Praxis III combines in-class assessment of teaching performance with written documentation of pre- and post observation interviews about teaching. It consists of four domains with benchmark behaviors.

The reference in blue is the NBPTS and its five core propositions. The mission of the NBPTS is to establish high and rigorous standards for what accomplished teachers should know and be able to do and to advance related education reforms for the purpose of improving student learning in American schools. Although each field has created its own set of standards, each set revolves around five core propositions; 1) teachers are committed to students and their learning, 2) teachers know the subjects they teach and how to teach those subjects to students, 3) teachers are responsible for managing and monitoring student learning, 4) teachers think systematically about their practice and learn from experience, and 5) teachers are members of learning communities.

They two occupy the same row because they seem to be harmonious in intent. This documenting of harmony continues throughout the crosswalk.

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Teacher Performance PRAXIS III	Ohio Licensure Performance Areas	NBPTS	STW Preservice Framework
A.2. Articulate clear learning goals of the lesson that are appropriate for the students.	➤ Understands how students learn and develop, & creates opportunities for each student's academic development.	2.2 Teachers command specialized knowledge of how to convey a subject to students.	✓ Children learn best when they are actively engaged in applying & testing their knowledge using real world problems. ✓ Prospective teachers will be prepared to teach effectively across a variety of disciplines, culture, races, and aptitude levels.
A.3. Demonstrating an understanding of the connections between the content that was learned previously, the current content, and the content that remains to be learned.	➤ Has a thorough understanding & knowledge of subject matter & uses such knowledge to create effective learning experience for students. ➤ Plans instruction based on knowledge of subject matter, of student, & of curriculum goals & models.	2.3 Teachers appreciate how knowledge in their subjects is created, organized, and linked to other disciplines.	✓ Children learn best when new ideas are connected to what they already know and have experienced. ✓ Apply STW concepts in such a way that it is seamless within the curriculum.

This page clearly shows the relationships among the four documents. Of particular note is how the Ohio Licensure Standards harmonize with the STW Framework. The State identifies 10 areas in which teachers need to create success for their students. Evaluators consider each of the ten areas in the light of student success: subject matter, student learning, diversity of learners, planning instruction, instructional strategies, learning environment, communication, assessment, professional development, and student support.

The Framework for Integrating School-to-Work into Preservice Teacher Education represents the roles and responsibilities of university and college faculties. The document iterates teaching and learning principles that preservice teachers need to demonstrate. There are 8 such principles: 1) children's learning is enhanced when teachers focus on the child, 2) children learn more and retain it longer when they apply their knowledge and skills to meaningful contexts, 3) an important role of the teachers is to help children make connections, 4) authentic (contextual) teaching is the pervasive, powerful tool in improving children's performance, 5) children learn best when next ideas are connected to what they already know and have experienced, 6) children learn best when they are actively engaged in applying and testing their knowledge and using real-world problems, 7) all children can learn, and 8) prospective teachers will be prepared to teach effectively across a variety of disciplines, culture, races, and aptitude levels.

Teacher Performance PRAXIS III	Ohio licensure Performance Areas	NBPTS	STW Preservice Framework
A.4 Create or select teaching methods, learning activities, & instructional materials or other resources that are appropriate for the students & that are aligned with the goals of the lesson.	- Has a thorough understanding & knowledge of subject matter & uses such knowledge to create effective learning experiences for students - Uses a variety of instructional strategies that encourage each student to develop critical-thinking & problem-solving skills.	2.1 Teachers generate multiple paths to knowledge.	- Children learn more & retain it longer when they apply their knowledge & skills to meaningful contexts. - An important role of the teacher is to help children make connections between what they are learning and how it applies to "real world" problems. - Authentic (contextual) teaching is a pervasive, powerful tool in improving children's performance. - Children learn best when they are actively engaged in applying and testing their knowledge using real-world problems.

4

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Teacher Performance PRACTICES	Ohio licensure Performance Areas	NBPIS	STW Preservice Framework
AS Create or select evaluation strategies that are appropriate for the students & that are aligned with the goals of the lesson	➤ Effectively uses formal & informal assessment strategies to evaluate student progress	3.4 Teachers regularly assess student progress	✓ Use authentic strategies to assess relevant student achievement.
Domain B Creating an Environment for Student Learning		<i>Proposition Three: Teachers are responsible for managing & monitoring student learning</i>	

5

Teacher Performance PRAXIS III	Ohio licensure Performance Areas	NBPTS	STW Preservice Framework
BI. Create a climate that promotes fairness.	➤ Creates a learning environment that encourages active, engaged learning; positive interaction, & self-motivation for all students. ➤ Understands differences in how students learn & provides instruction to accommodate such diversity.	3.1 Teachers call on multiple methods to meet their goals	✓ All children can learn. The wide diversity of learners requires an understanding of a variety of culture, races, aptitude levels, & interests. ✓ Children learn best when new ideas are connected to what they already know and have experienced. ✓ Children learn best when they are actively engaged in applying and testing their knowledge using real-world problems.

6

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Teacher Performance PRANIS III	Ohio licensure Performance Areas	NBPTS	STW Preservice Framework
B2: Establish and maintain rapport with students	➤ Creates a learning environment that encourages active, engaged learning; positive interaction; & self-motivation for all students. ➤ Understands differences in how students learn & provides instruction to accommodate such diversity.	3.1 Teachers call on multiple methods to meet their goals.	✓ All children can learn. The wide diversity of learners requires an understanding of a variety of culture, races, aptitude levels, & interests. ✓ Children learn best when new ideas are connected to what they already know and have experienced. ✓ Children learn best when they are actively engaged in applying and testing their knowledge using real-world problems

7

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Teacher Performance PRAXIS III	Ohio licensure Performance Areas	NBPTS	STW Preservice Framework
B3. Communicate challenging learning expectations to each student.	➤ Creates a learning environment that encourages active, engaged learning; positive interaction; & self-motivation for all students.	3.2. Teachers orchestrate learning in group settings. 3.3 Teachers place a premium on student engagement.	✓ Children learn best when they are actively engaged in applying and testing their knowledge using real-world problems. ✓ All children can learn. The wide diversity of learners requires an understanding of a variety of culture, races, aptitude levels, & interests.
B4. Establish and maintain consistent standards of classroom behavior	➤ Creates a learning environment that encourages active, engaged learning; positive interaction; & self-motivation for all students.	1. 1 Teachers recognize individual differences in their students & adjust their practice.	✓ Analyze how the concept of work presents itself in school.

8

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Teacher Performance PRAXIS III	Ohio licensure Performance Areas	NBPTS	STW Preservice Framework
B5. Make the physical environment as safe & conducive to learning as possible.	➤Creates a learning environment that encourages active, engaged learning; positive interaction; & self-motivation for all students.	3. 1 Teachers call on multiple methods to meet their goals.	✓ Design lessons that will include learning in a real world context.
Domain C: Teaching for Student Learning.		<i>Proposition One: Teachers are committed to students & their learning.</i>	

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Teacher Performance PRAXIS III	Ohio licensure Performance Areas	NBPTS	STW Preservice Framework
C1. Make learning goals & instructional procedures clear to students.	➤ Creates a learning environment that encourages active, engaged learning; positive interaction; & self-motivation for all students. ➤ Effectively communicates in the classroom by using a variety of communication skills, including verbal & nonverbal techniques, technology, & media.	1. 2 Teachers have an understanding of how students develop and learn.	✓ Authentic (contextual) teaching is a pervasive, powerful tool in improving children's performance ✓ An important role of the teacher is to help children make connections between what they are learning and how it applies to "real world" problems.

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Teacher Performance PRAXIS III	Ohio licensure Performance Areas	NBPTS	STW Preservice Framework
C2. Make content comprehensible to students.	➤ Has a thorough understanding & knowledge of subject matter & uses such knowledge to create effective learning experiences for students. ➤ Understands how students learn and develop, & creates opportunities for each student's academic development. ➤ Effectively communicates in the classroom by using a variety of communication skills, including verbal & nonverbal techniques, technology, & media.	1.2 Teachers have an understanding of how students develop & learn.	

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Teacher Performance PRAXIS III	Ohio licensure Performance Areas	NBPTS	STW Preservice Framework
C3. Encourage students to extend their thinking.	Uses a variety of instructional strategies that encourage each student to develop critical-thinking & problem-solving skills.	1. 3 Teachers' mission extends beyond developing the cognitive capacity of their students.	✓ Children learn more & retain it longer when they apply their knowledge & skills to meaningful contexts. ✓ Authentic (contextual) teaching is a pervasive, powerful tool in improving children's performance. ✓ An important role of the teacher is to help children make connections between what they are learning and how it applies to "real world" problems.

12

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Teacher Performance PRAXIS III	Ohio licensure Performance Areas	NBPTS	STW Preservice Framework
C4. Monitor students' understanding of content through a variety of means, providing feedback to students to assist learning, & adjust learning activities as the situation demands.	➤ Effectively uses formal & informal assessment strategies to evaluate student progress.	<i>Proposition Four: Teachers think systematically about their practice and learn from experience.</i>	✓ Use authentic assessment strategies to assess relevant student achievement.

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Teacher Performance PRAXIS III	Ohio licensure Performance Areas	NBPTS	STW Preservice Framework
CS Use instructional time effectively	- Has a thorough understanding & knowledge of subject matter & uses such knowledge to create effective learning experiences for students. - Plans instruction based on knowledge of subject matter, of students, & of curriculum goals & models.	4.1 Teachers are continually making difficult choices that test their judgment.	- An important role of the teacher is to help children make connections between what they are learning and how it applies to "real world" problems. - Prospective teachers will be prepared to teach effectively across a variety of disciplines, cultures, races, and aptitude levels.
Domain D: Teacher Professionalism.		<i>Proposition Five: Teachers contribute to school effectiveness by collaborating with other professionals.</i>	

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Teacher Performance PRAXIS III	Ohio licensure Performance Areas	NBPTS	STW Preservice Framework
D1. Reflect on the extent to which the learning goals were met.	➤ Analyzes past experiences & pursues professional development opportunities to improve future performance.		✓ Demonstrate the ability to map cross-discipline content and develop content for integration.
D2. Demonstrate a sense of efficacy.	➤ Effectively communicates in the classroom by using a variety of communication skills, including verbal & nonverbal techniques, technology, & media.	4.2 Teachers seek the advice of others & draw on education research and scholarship to improve their practice.	✓ Prospective teachers will be prepared to teach effectively across a variety of disciplines, cultures, races, and aptitude levels.

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Teacher Performance PRAXIS III	Ohio licensure Performance Areas	NBPTS	STW Preservice Framework
D3. Build professional relationships with colleagues to share teaching insights and to coordinate learning activities for students.	➤ Works with parents/family members, school colleagues, & community members to support student learning & development.	5.1 Teachers are members of learning communities.	✓ Demonstrate the ability to map cross-discipline content and develop content for integration.
D4. Communicate with parents or guardians about student learning.	➤ Works with parents/family members, school colleagues, & community members to support student learning & development.	5.2 Teachers work collaboratively with parents.	✓ Assist parents to see connections between school, subjects, and workplace.

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Contextual Learning

A Corresponding Vision

Documents Useful to Arts & Science Faculty

Crosswalk through:

PRAXIS III Teacher Performance Assessments Assessment Criteria	Ohio Licensure Standards 10 Performance Areas	National Board For Professional Teaching Standards Five Core Propositions	Connecting School Life to Work Life S-T-W Preservice Teacher Education Programs Framework Teaching & Learning Principles and Outcomes
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Teacher Performance PRAXIS III	Ohio licensure Performance Areas	NBPTS	STW Preservice Framework
Domain A: Organizing Content Knowledge for Student Learning		Proposition Two: Teachers know the subjects they teach and how to teach those subjects to students.	
A1. Become familiar with relevant aspects of students' background knowledge & experience.	➤ Understands how students learn and develop, & creates opportunities for each student's academic development. ➤ Understands differences in how students learn & provides instruction to accommodate such diversity. ➤ Plans instruction based on knowledge of subject matter, of students, & of curriculum goals & models.	2.1 Teachers generate multiple paths to knowledge.	✓ Children's learning is enhance when teachers focus on the child. ✓ All children can learn. The wide diversity of learners requires an understanding of a variety o culture, races, aptitude levels, & interests.

Teacher Performance PRAXIS III	Ohio licensure Performance Areas	NBPTS	STW Preservice Framework
A2. Articulate clear learning goals for the lesson that are appropriate for the students.	➤ Understands how students learn and develop, & creates opportunities for each student's academic development.	2.2 Teachers command specialized knowledge of how to convey a subject to students.	✓ Children learn best when they are actively engaged in applying & testing their knowledge using real world problems. ✓ Prospective teachers will be prepared to teach effectively across a variety of disciplines, culture, races, and aptitude levels.
A3. Demonstrate an understanding of the connections between the content that was learned previously, the current content, and the content that remains to be learned.	➤ Has a thorough understanding & knowledge of subject matter & uses such knowledge to create effective learning experience for students. ➤ Plans instruction based on knowledge of subject matter, of student, & of curriculum goals & models.	2.3 Teachers appreciate how knowledge in their subjects is created, organized, and linked to other disciplines.	✓ Children learn best when new ideas are connected to what they already know and have experienced. ✓ Apply STW concepts in such a way that it is seamless within the curriculum.

Teacher Performance PRAXIS III	Ohio licensure Performance Areas	NBPTS	STW Preservice Framework
A.4 Create or select teaching methods, learning activities, & instructional materials or other resources that are appropriate for the students & that are aligned with the goals of the lesson.	➤ Has a thorough understanding & knowledge of subject matter & uses such knowledge to create effective learning experiences for students. ➤ Uses a variety of instructional strategies that encourage each student to develop critical-thinking & problem-solving skills.	2.1 Teachers generate multiple paths to knowledge.	✓ Children learn more & retain it longer when they apply their knowledge & skills to meaningful contexts. ✓ An important role of the teacher is to help children make connections between what they are learning and how it applies to “real world” problems. ✓ Authentic (contextual) teaching is a pervasive, powerful tool in improving children’s performance. ✓ Children learn best when they are actively engaged in applying and testing their knowledge using real-world problems.

Teacher Performance PRAXIS III	Ohio licensure Performance Areas	NBPTS	STW Preservice Framework
A5. Create or select evaluation strategies that are appropriate for the students & that are aligned with the goals of the lesson.	➤ Effectively uses formal & informal assessment strategies to evaluate student progress	3.4 Teachers regularly assess student progress	✓ Use authentic strategies to assess relevant student achievement.
Domain B: Creating an Environment for Student Learning		<i>Proposition Three: Teachers are responsible for managing & monitoring student learning</i>	

Teacher Performance PRAXIS III	Ohio licensure Performance Areas	NBPTS	STW Preservice Framework
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Domain D: Teacher Professionalism.		<i>Proposition Five: Teachers contribute to school effectiveness by collaborating with other professionals</i>	

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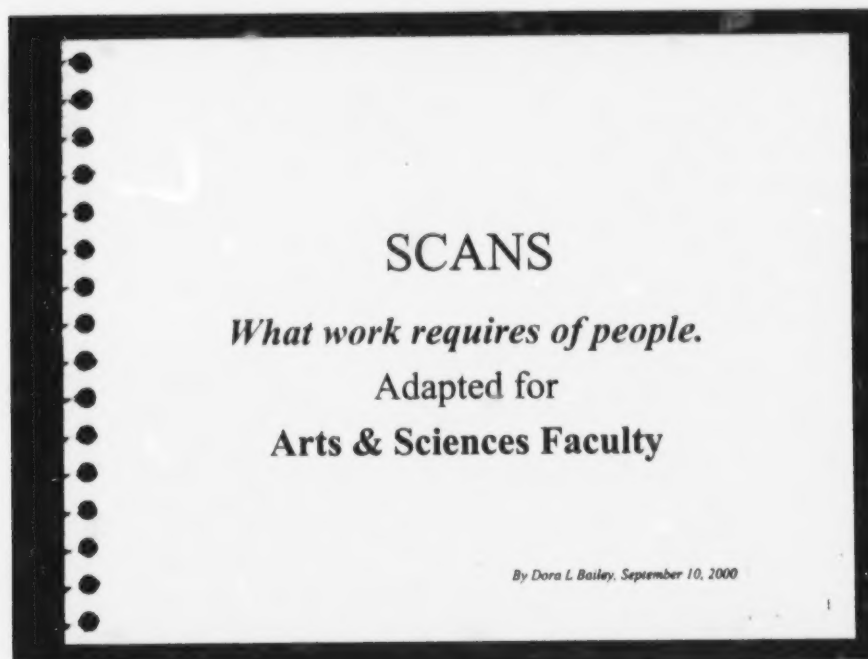
SCANS

What Work Requires of People

Adapted for Arts & Sciences Faculty

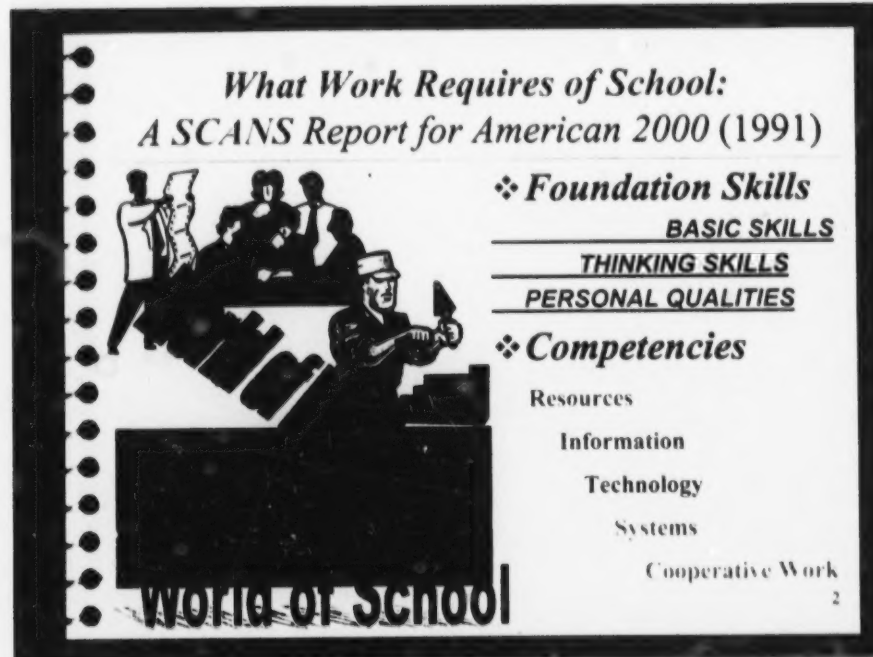
Notes for this PowerPoint Presentation
are provided in this section

See the CD-Rom for the electronic version



Click to animate the lines and pictures.

What Work Requires of School: A SCANS Report for American 2000 (1991) was developed by the Secretary's Commission on Achieving Necessary Skills (SCANS) of the U.S. Department of Labor. This report identifies competencies and the foundation necessary for successful induction into careers. Arts and Sciences faculty may find this information useful in revisiting their syllabi. A good many students in the freshman and sophomore-level courses eventually become teachers. These teachers teach as they have been taught. Those in Arts & Sciences can consider how much hands on experiences and simulated experiences their student get. The more real or "real-like" experiences college students get as they are learning the content areas, the more they are able to apply these techniques and enthusiasms for their future pupils.

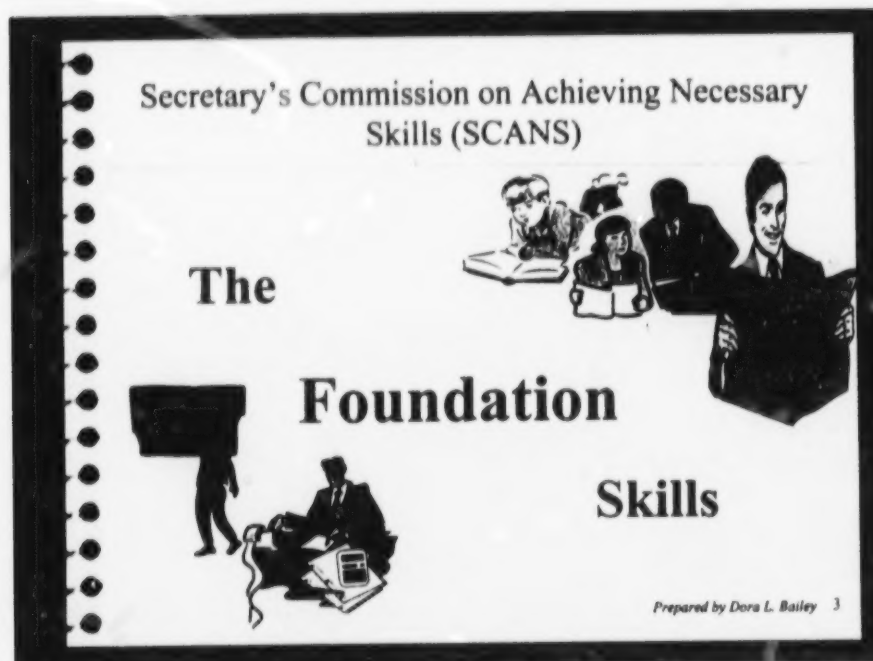


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One of the reasons we ask people to go to college is to train and educate them for the world of work. We ask them to think in terms of a career instead of in terms of a job. The whole notion of career implies an entry level ability and a progressive advancement as the person's ability develops.

Arts & Sciences Faculty can benefit from a perusal of the SCANS report in that it delineates what employers hope their employees will bring to their job. All of the disciplines can look for ways for their students to practice some of the skills and abilities noted in the SCANS. Students who are going to become employed tomorrow need to be able to think about the concepts in the discipline under study. It is not enough to memorize the concepts and the uses of the concepts. It is hoped that this document will help Arts and Sciences faculty apply another lens to their course offerings.

There is a section in this notebook that shows how some faculty brought to the foreground some of these skills. They did this through contextual experiences and projects that asked for application in a real or simulated setting. The notion of one correct response to any task or question has evolved to many appropriate responses, application of other disciplines' concepts, and the generation of additional tasks and questions.



Click to animate the lines and pictures.

• *What Work Requires of School: A SCANS Report for American 2000* (1991) was developed by the Secretary's Commission on Achieving Necessary Skills (SCANS) of the U.S. Department of Labor. This report identifies competencies and the foundation necessary for successful induction into careers. According to business and labor, development of these competencies and foundation skills could begin in the early school years and continue through high school.

• The foundation skills include a person's development of reading and mathematics. Reading is a skill that can be developed early on in schooling. Reading continues to develop as a person uses it. But the adult's ability to use reading is directly related to the foundational development in school.

• Mathematics is a skill that can be developed early on in schooling. Mathematics acuity continues to develop as a person uses it. But the adult's ability to use mathematics is directly related to the foundational development in school. Interest in using Mathematics in daily living can be acquired or turned off during the college years.

• In the Foundation category competence requires basic skills, thinking skills, and personal qualities.

• To some extent according to developmental appropriateness, all of these could be included in every undergraduate program for students.

FOUNDATION SKILLS

BASIC SKILLS

1. *Reading* - locates, understands, and interprets written information in documents such as manuals, graphs, and schedules.



2. *Writing* - communicates thoughts, ideas, information, and messages in writing and creates documents such as directions, manuals, reports, and flow charts.



4

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The Foundation Skills could be practiced in all post high school courses during the first two years. Students could then build a lifelong learning agenda.

Reading is a skill and an ability it is difficult to get along without in our 21st century. Adults are finding the need to understand what others write about their jobs, careers, avocations, income producing activities, etc. The ability to understand what others write is established in the early school years and is refined during the rest of the school years. Many post high school faculty neglect to teach their students how to read their texts and references. Usually, each discipline has special metacognitive skills that can be applied to reading.

Writing is a skill that is developed in the early school years. The ability to compose thoughts clearly and concisely are abilities that continue to be developed throughout the rest of schooling. All post high school courses could consider reflective writing experiences.

FOUNDATION SKILLS

BASIC SKILLS



3. *Arithmetic/Mathematics* - performs basic computations and approaches practical problems by choosing appropriately from a variety of mathematical techniques.



4. *Listening* - receives, attends to, interprets, and responds to verbal messages and other cues.



5. *Speaking* - organizes ideas and communicates orally.



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College and post high school faculty could find strategies to maximize these skills for all learners.

FOUNDATION SKILLS

THINKING SKILLS



1. *Creative Thinking* - generates new ideas
2. *Decision Making* - specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative
3. *Problem Solving* - recognizes problems and devises and implements plan of action
4. *Seeing Things in the Mind's Eye* - organizes and processes symbols, pictures, graphs, objects and other information

6

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Thinking skills are the processing network necessary for success in school-life and in work-life. In order to function in today's world students need to practice thinking through problems and coming up with alternative solutions. This is what the world they will be entering will demand of them. Those that can do this will be successful and those that can not think through a problem will not be able to contribute.

FOUNDATION SKILLS

THINKING SKILLS

5. *Knowing How to Learn* - uses efficient learning technique to acquire and apply new knowledge and skills.
6. *Reasoning* - discovers a rule or principle underlying the relationship between two or more objects and applies it in solving a problem.



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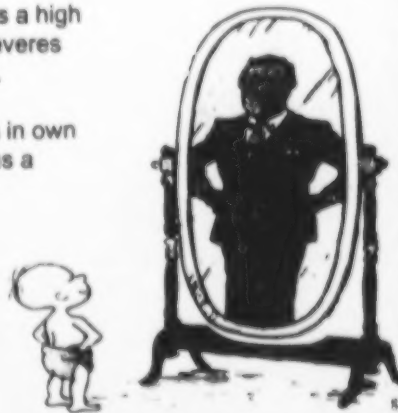
Both knowing how to learn and reasoning require perseverance and can be acquired more easily along side of someone else who is also developing the ability to learn and reason.

Part of what college faculty can do is demonstrate where to find information and how to learn in a manner that provides a sense of accomplishment if not a sense of enjoyment.

FOUNDATION SKILLS

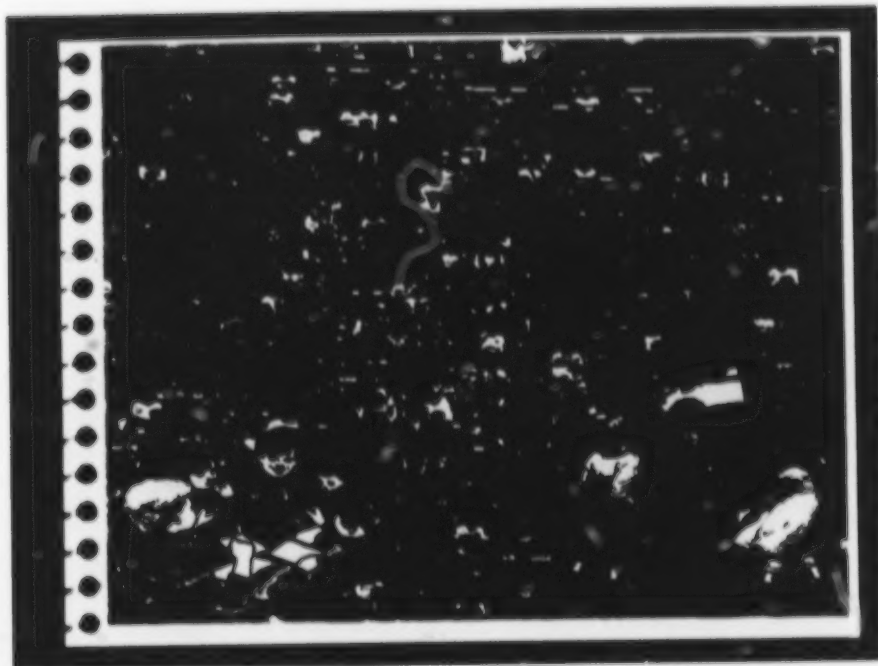
PERSONAL QUALITIES

1. *Responsibility* - exerts a high level of effort and perseveres toward goal attainment.
2. *Self-Esteem* - believes in own self-worth and maintains a positive view of self.



Click to animate the lines and pictures.

People who have a high sense of self-worth usually act responsibility towards themselves and others. It is the task of colleges and universities to help learners see their worth and to help build their positive self-esteem. In order to build positive self-esteem learners need many opportunities to see themselves as able in real world work situations. It would be hoped that one day all learners can come to see themselves as capable adults.



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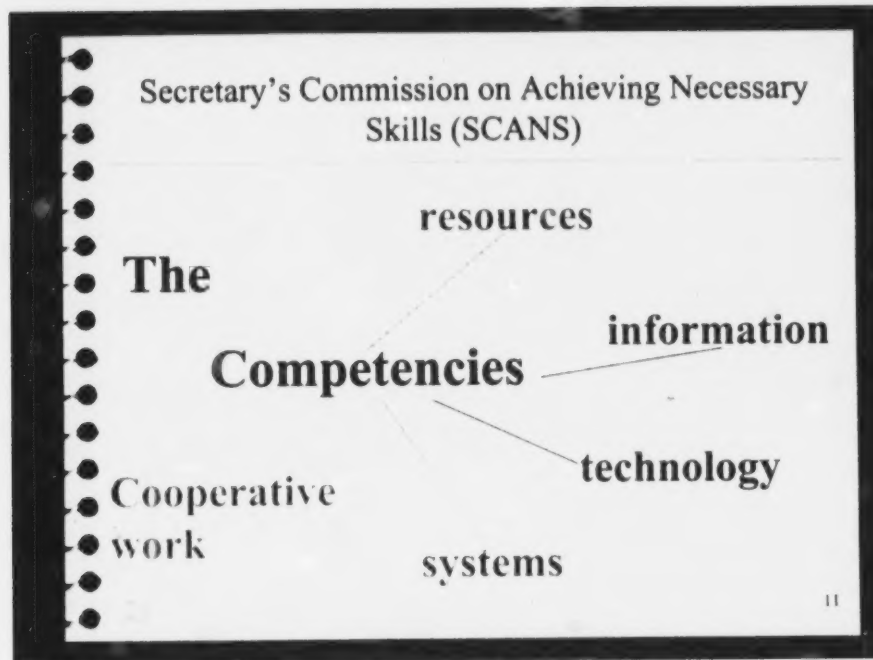
We live in a social world. There are people all around us and we need to be able to get along with them and work with them toward common goals. It will be the ability of many people to work toward common goals that will advance our civilization. People can come to do this without someone constantly overseeing them and without trying to get something for nothing. Such a vision of the future only has a chance of coming to fruition if college faculty treat all of their learners with respect and give them relevant work to do that relates to the concepts under study. This work needs to be done in a manner that applauds cooperative work as versus rewarding competition.

FOUNDATION SKILLS	<u>PERSONAL QUALITIES</u>
4. <i>Self-Management</i> - assesses self accurately, sets personal goals, monitors progress, and exhibits self-control. 5. <i>Integrity/Honesty</i> - pursues ethical courses of action.	

10

Click to animate the lines and pictures.

As learners progress in their development, they need experiences that celebrate their ability to manage themselves. School too often keeps management as an external factor, then when people enter the world of work they still need the external management because they have not developed internal ability to manage themselves. College faculty can help students develop this ability to manage themselves. More needs to be done than to dictate self-management and punish the lack of it. It is the faculty that can best come to know their students and help them develop self- management. Along with self-management comes integrity and honesty. It is difficulty to help students develop honesty when all around them politics is rewarding dishonesty. Politics is in all institutions. College faculty can help by obviously modeling and discussing these.



Click to animate the lines and pictures.

According to SCANS the competencies that work-life would like school-life to consider and give experiences for children are:

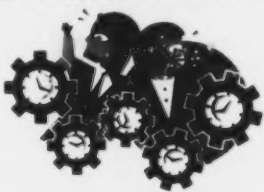
- How to identify, organize, plan, and allocate resources,
- How to work with others,
- How to acquire and use information,
- How to understand complex inter-relationships or systems,
- How to work with a variety of technology.

THE COMPETENCIES

RESOURCES

Identifies, organizes, plans, and allocates resources:

1. Time - Selects goal-relevant activities, ranks them, allocates time, and prepares and follows schedules





2. Money - Uses or prepares budgets, makes forecasts, keeps records, and makes adjustments to meet objectives

12

Click to animate the lines and pictures.

The competencies labeled resources, include time management and money management. Students need an operational definition of each competency. These competencies can be accommodated within regular units of study. College faculty use these competencies in their programs but frequently do not help learners make real- world connections.

Further explanations of the competencies are on these slides.

THE COMPETENCIES

3. *Materials/facilities* –
Acquires, stores, allocates, and uses
materials or space efficiently

4. *Human Resources* -
Assesses skills and distributes
work accordingly, evaluates
performance and provides
feedback



13

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The competencies labeled *resources* also include management of materials and facilities as well as management of human resources. College faculty can have groups of learners manage how to use each other in the most efficient and effective manner. They can figure out how best to accomplish tasks using materials and taking advantages of the facilities available to them.

THE COMPETENCIES

INTERPERSONAL

Works with others

1. *Participates as Member of a Team -*
contributes to group effort

2. *Teaches Others New Skills -*
assists others to develop skills

3. *Serves Clients/Customers -*
works to satisfy client
expectations



14

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In the world of the 21st century, all of us need to participate as a member of a team in order to solve the global problems so that we can all survive.

Even simple bartering is a matter of satisfying the other person. The client needs to feel that you want him/her there and that he/she is important to your business. Too often attitudes of young people dismiss the clients in front of them in favor of their own thought or social world.

When a content area faculty considers that s/he is really about selling the necessity of the content, then these skills concepts become interesting food for thought for students.

THE COMPETENCIES



4. Exercises Leadership -

communicates ideas to justify position, persuades and convinces others, and responsibly challenges procedures/ policies

5. Negotiates - Works toward agreements involving exchange of resources and resolves divergent interests

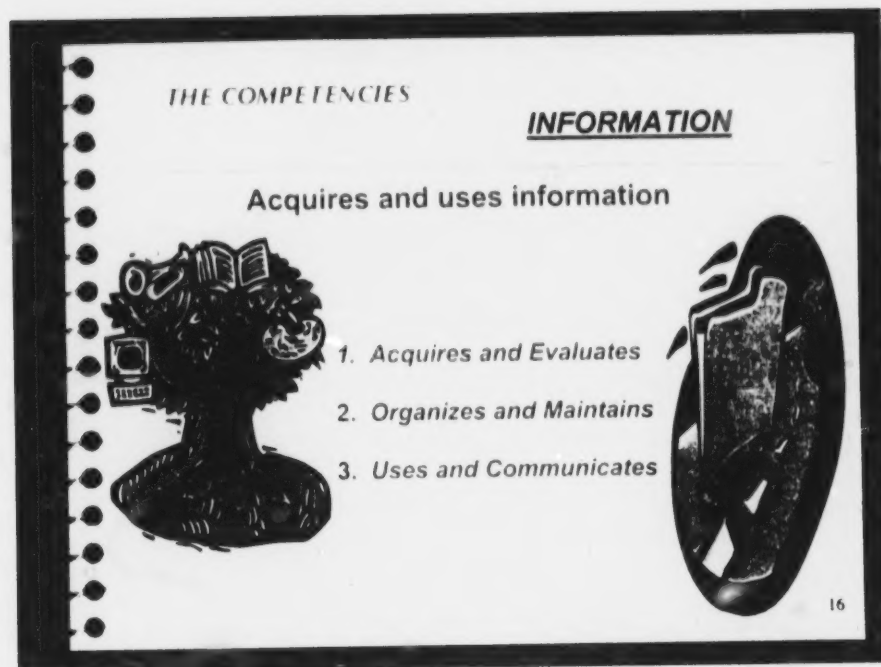
6. Works with Diversity - Works well with men and women of diverse backgrounds



INTERPERSONAL

Click to animate the lines and pictures.

In order for anything to be done, someone must take on the leadership role. Leaders consider negotiations with others as a way of working with diverse groups of people who have different priorities & goals and different ways of reading those goals.



Click to animate the lines and pictures.

We live in the information age. Virtually any information is available. The task is to figure out what information to acquire for what purposes and to figure out how to relate the information to other information. A further task is to figure out how to communicate the relationships of information and information analyses. All of this can be practiced in college courses. In fact if it is not practiced here, then the students will not know what to do with all of the information available once they enter the world of work.

THE COMPETENCIES

SYSTEMS

Understands complex inter-relationships

1. *Understands Systems* - Knows how social, organizational, and technological systems work and operates effectively
2. *Monitors and Corrects Performance* - Distinguishes trends, predicts impacts on systems operations, diagnoses deviations in systems' performance and corrects malfunctions
3. *Improves or Designs Systems* - Suggests modifications to existing systems and develops new or alternative systems to improve performance

17

Click to animate the lines and pictures.

Systems is a critical concept identified by NCTM (National Council of Teachers of Mathematics) and AAAS--Science for All Americans.

THE COMPETENCIES

TECHNOLOGY

Works with a variety of technologies

1. *Selects Technology* - Chooses procedures, tools or equipment including computers and related technologies



2. *Applies Technology to Task* - Understands overall intent and proper procedures for setup and operation of equipment



3. *Maintains and Troubleshoots Equipment* - prevents, identifies, or solves problems with equipment, including computers and other technologies



Click to animate the lines and pictures.

This is a match with the Goals 2000 agenda. These technology competencies are not adding to what faculty should be doing but linking courses to reality.

College aged Learners can learn to choose the technological tools, whether it be a microscope or a computer program, they need to accomplish tasks that mirror real life tasks.

SCANS

What work requires of people.

Adapted for

Arts & Sciences Faculty

By Dora L. Bailey, September 10, 2000

1

What Work Requires of School: A SCANS Report for America 2000 (1991)



❖ *Foundation Skills*

BASIC SKILLS

THINKING SKILLS

PERSONAL QUALITIES

❖ *Competencies*

Resources

Information

Technology

Systems

Cooperative Work

2

World of School

Secretary's Commission on Achieving Necessary
Skills (SCANS)

The

Foundation

Skills



Prepared by Dora L. Bailey 3

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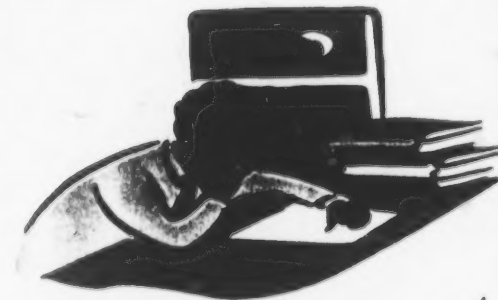
FOUNDATION SKILLS

BASIC SKILLS

1. *Reading* - locates, understands, and interprets written information in documents such as manuals, graphs, and schedules.



2. *Writing* - communicates thoughts, ideas, information, and messages in writing and creates documents such as, directions, manuals, reports, and flow charts.



FOUNDATION SKILLS

BASIC SKILLS



3. *Arithmetic/Mathematics* - performs basic computations and approaches practical problems by choosing appropriately from a variety of mathematical techniques.



4. *Listening* - receives, attends to, interprets, and responds to verbal messages and other cues.



5. *Speaking* - organizes ideas and communicates orally.



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FOUNDATION SKILLS

THINKING SKILLS

1. ***Creative Thinking*** - generates new ideas
2. ***Decision Making*** - specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative
3. ***Problem Solving*** - recognizes problems and devises and implements plan of action
4. ***Seeing Things in the Mind's Eye*** - organizes and processes symbols, pictures, graphs, objects and other information



FOUNDATION SKILLS

THINKING SKILLS

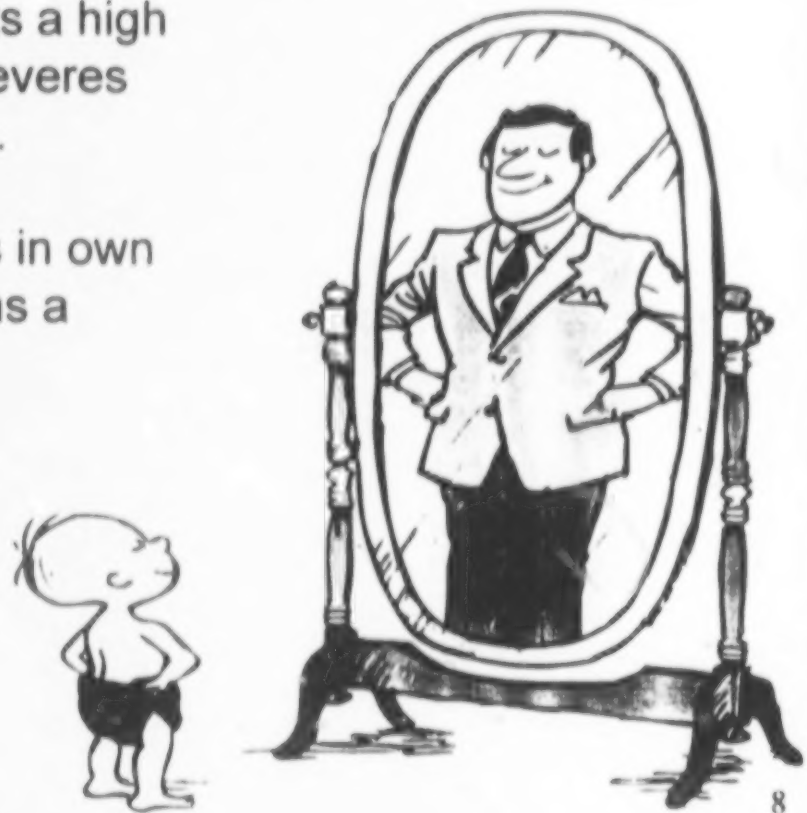
5. **Knowing How to Learn** - uses efficient learning technique to acquire and apply new knowledge and skills.
6. **Reasoning** - discovers a rule or principle underlying the relationship between two or more objects and applies it in solving a problem.

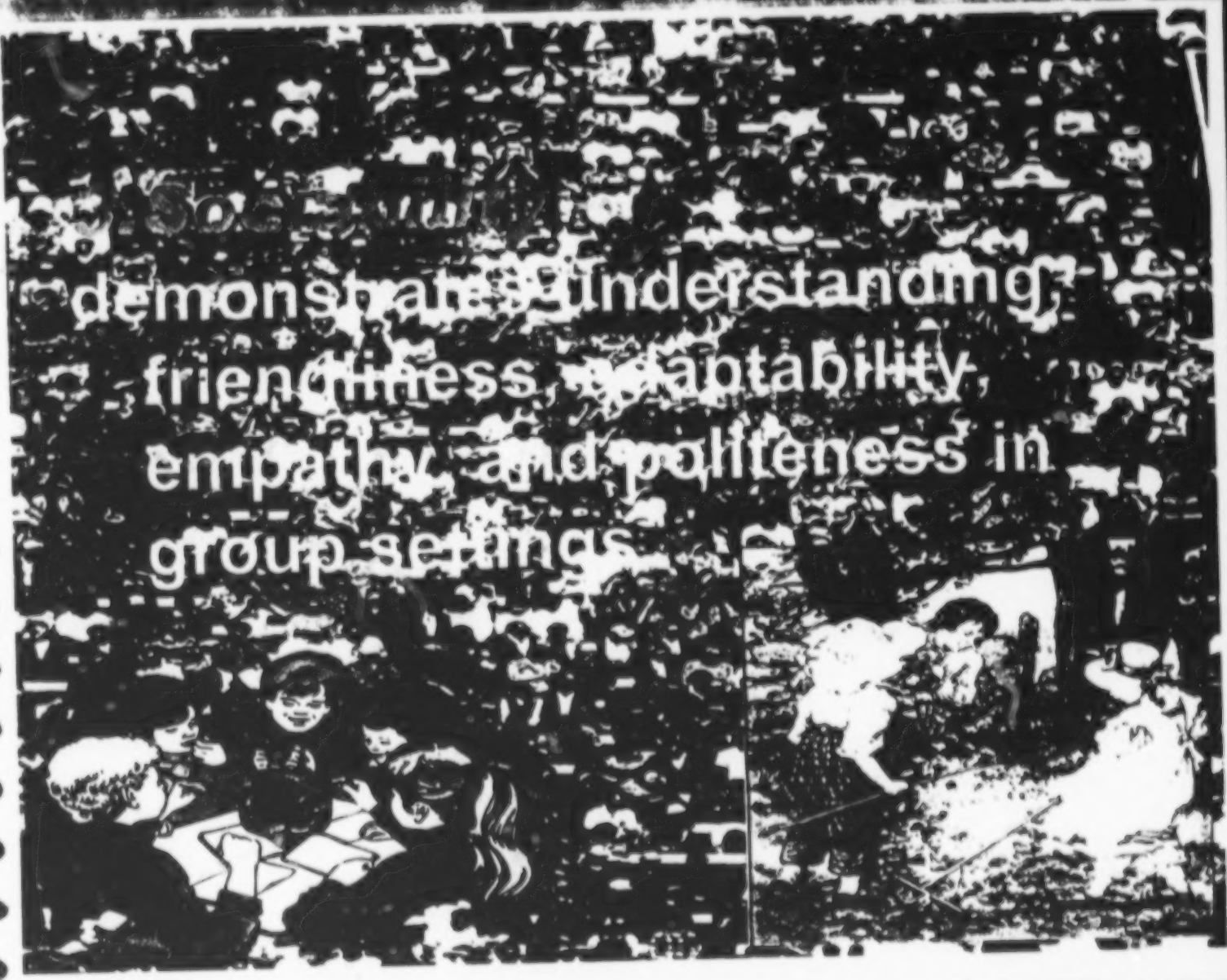


FOUNDATION SKILLS

PERSONAL QUALITIES

1. *Responsibility* - exerts a high level of effort and perseveres toward goal attainment.
2. *Self-Esteem* - believes in own self-worth and maintains a positive view of self.





demonstrates understanding,
friendliness, adaptability,
empathy, and politeness in
group settings.

FOUNDATION SKILLS

PERSONAL QUALITIES

4. *Self-Management* - assesses self accurately, sets personal goals, monitors progress, and exhibits self-control.
5. *Integrity/Honesty* - pursues ethical courses of action.



Secretary's Commission on Achieving Necessary
Skills (SCANS)

The

Competencies

resources

information

technology

systems

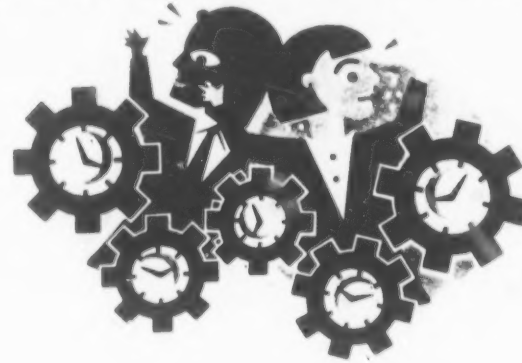
**Cooperative
work**

THE COMPETENCIES

RESOURCES

Identifies, organizes, plans, and allocates resources:

1 *Time* - Selects goal-relevant activities, ranks them, allocates time, and prepares and follows schedules



2 *Money* - Uses or prepares budgets, makes forecasts, keeps records, and makes adjustments to meet objectives

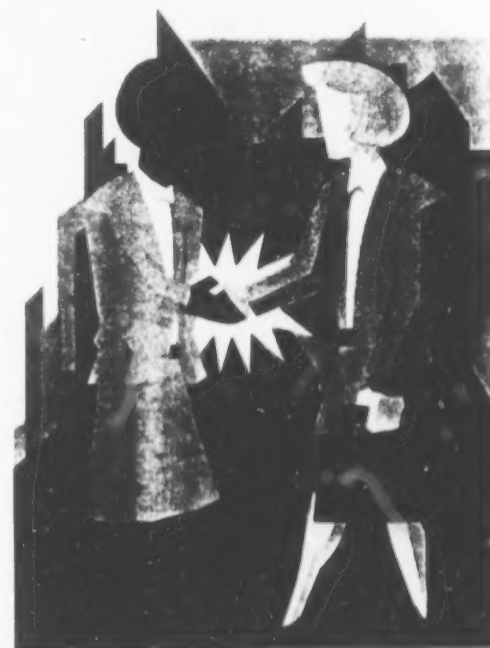
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THE COMPETENCIES

RESOURCES

3. *Materials/facilities* - Acquires, stores, allocates, and uses materials or space efficiently

4. *Human Resources* -
Assesses skills and distributes work accordingly, evaluates performance and provides feedback



THE COMPETENCIES

INTERPERSONAL

Works with others

1. *Participates as Member of a Team -*
contributes to group effort

2. *Teaches Others New Skills -*
assists others to develop skills

3. *Serves Clients/Customers -*
works to satisfy client
expectations



THE COMPETENCIES

INTERPERSONAL



4. *Exercises Leadership* - communicates ideas to justify position, persuades and convinces others, and responsibly challenges procedures/policies

5. *Negotiates* - Works toward agreements involving exchange of resources and resolves divergent interests

6. *Works with Diversity* - Works well with men and women of diverse backgrounds



THE COMPETENCIES

INFORMATION

Acquires and uses information

1. *Acquires and
Evaluates*

2. *Organizes and
Maintains*

3. *Uses and
Communicates*



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THE COMPETENCIES

SYSTEMS

Understands complex inter-relationships

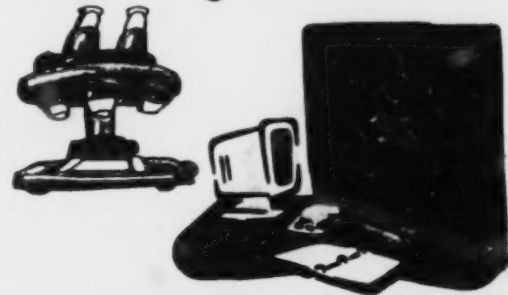
1. *Understands Systems* - Knows how social, organizational, and technological systems work and operates effectively
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THE COMPETENCIES

TECHNOLOGY

Works with a variety of technologies

1. *Selects Technology* - Chooses procedures, tools or equipment including computers and related technologies



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MIND MAPPING
FOR
ARTS & SCIENCES FACULTY

Dora L. Bailey
Youngstown State University
September 2000

MIND MAPPING

Mind Mapping is a way for Arts and Science faculty to graphically create and illustrate connections of ideas, concepts, subconcepts, and supporting details that have been under study. Mind Mapping makes a good closing activity, especially for adults. It helps them organize the ideas they have been considering in relation to what they previously thought. A Mind Map is a strategy that allows group members to collectively construct the meaning from an experience or idea under study. Mind Mapping is particularly dynamic and effective in small groups. All people filter their experiences through their existing schema, and since everyone's schema is necessarily different, all bring valuable perspectives to a small group's examination of an experience or idea.

The Arts and Sciences faculty participants can take the experience of considering Contextual Learning or any other idea under study and decide on the organizing concept or "big picture." The main concept, the experience under discussion or idea under study, fills a central spot on a piece of paper. They will then "brainstorm" for the subconcepts and supporting details that they deem necessary to understand the concept fully. Members of the group then decide on which relating concepts and subconcepts radiate from this central idea and which supporting details trail from which of these subconcepts (See example on page 4). It is an effective way for people to construct meaning from an experience or an idea under study. Mind Mapping effectively brings closure to an idea under study without closing the discussion or room for more possibilities.

Included on page 5 are two examples of Mind Maps that were completed by adult learners considering the inclusion of School-to-Work in P-12 teacher education programs. Both samples were done by groups that were guided by the process described below. One shows a

great amount of detail. Although the other does not show detail, the quality of discussion the group maintained was the highest of the four groups that created Mind Maps. Quantity does not always represent the highest quality. These samples are being included to show the concepts that Education faculty thought the School-to-Work or Contextual Learning incorporated. The samples were done after an intensive two-day conference about the concept.

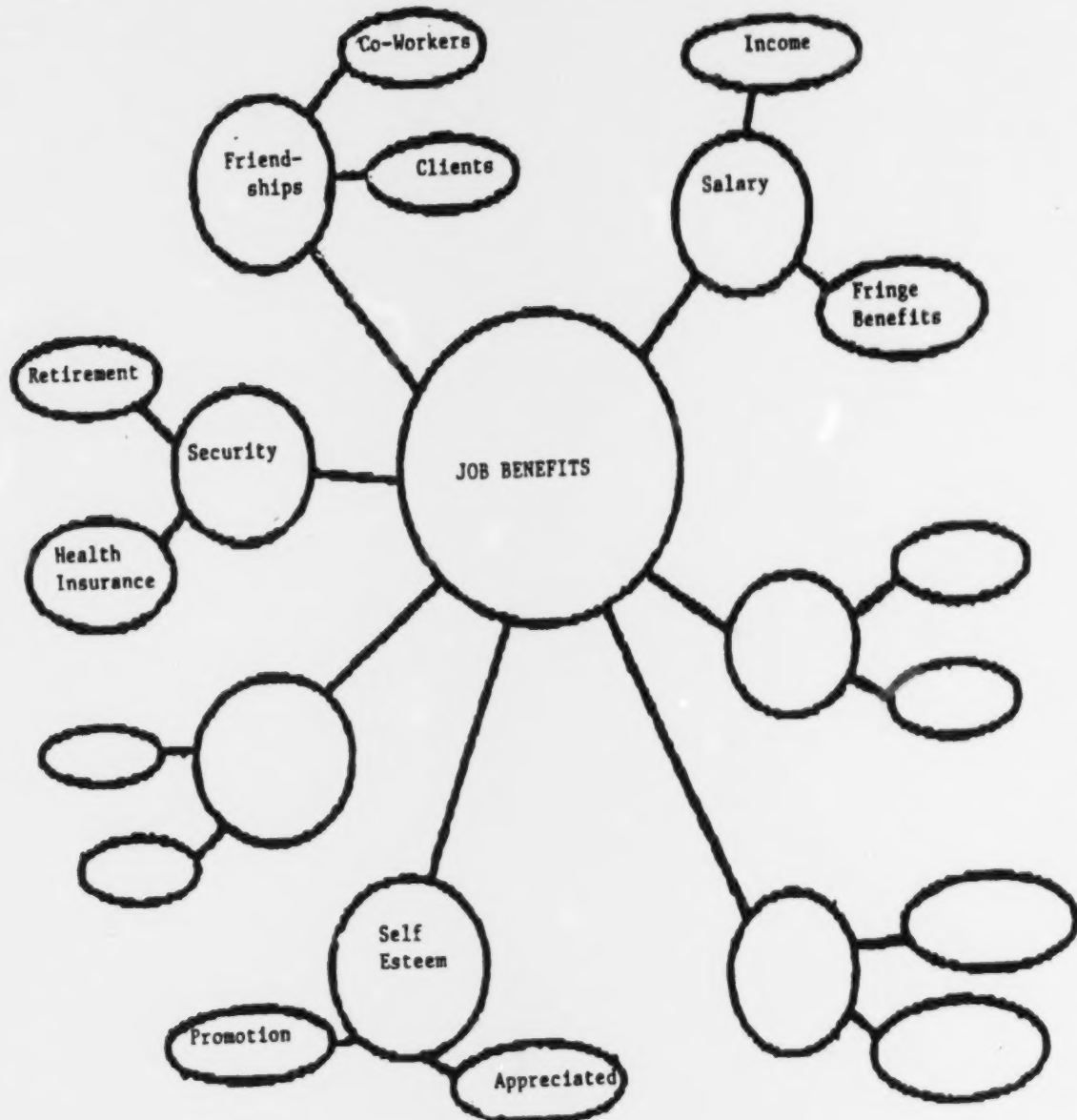
Following are the six simple steps for facilitating Mind Mapping after an experience or study of an idea.

1. For about 5 minutes ask participants to write words or phrases that come to mind about the experience or idea being studied. These words will form the basis for discussion.
2. Share all of the above information and rationale on Mind Mapping including an example of Mind Mapping shown on page 4. This gives participants a mental map of the task at hand.
3. Divide participants into groups of 3-5 and have the groups share their words and phrases for about 5 minutes. This begins the recognition of the different perspectives represented in the group. In a natural idea processing fashion, people will note similarities and difference; they will begin to accommodate each other and leadership will emerge.
4. Give time limits for accomplishing artificial segments of the Mind Mapping. Even though the segments are artificial and the groups will probably not follow the segmentation, the warning of time segments passed and what should have been accomplished serves to force consensus and move the task forward.

- a. Allow 5 minutes to decide what should go in the center as an organizing concept. In the examples (page 5) the organizing concepts were given to the participants as a modification of Mind Mapping.
 - b. Allow 10 minutes to decide on the subconcepts
 - c. Allow 10 minutes to decide on the supporting details.
5. Facilitate all of the groups by inserting yourself and asking for a report on progress as well as asking key questions of the group to move them forward in their thinking.
 - a. Enter each group within the first 5 minutes.
 - b. Reenter the group that is slow getting started first.
 - c. Do not stay more than 4 minutes in any group at any one time.
6. Each group report out and share graphic Mind Maps with the whole group. The most important thing for them to share is this one page graphic of how they view the idea or experienced to be meaningfully organized. It is also important that the group share their thinking processes as they made decisions. This sharing process enriches the experience and has been reported as particularly impactful and memorable.

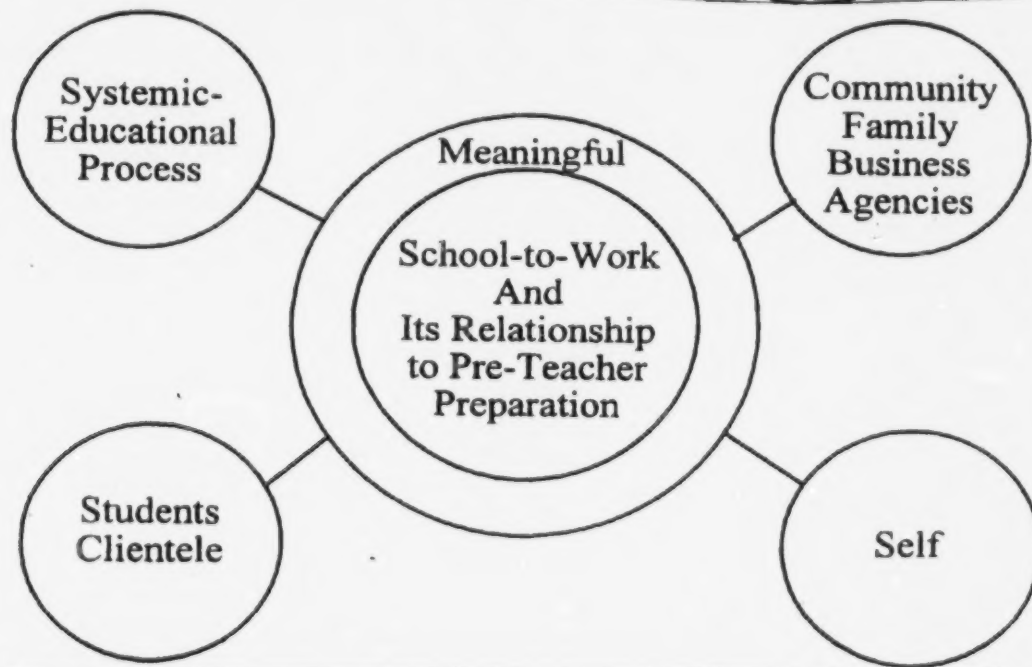
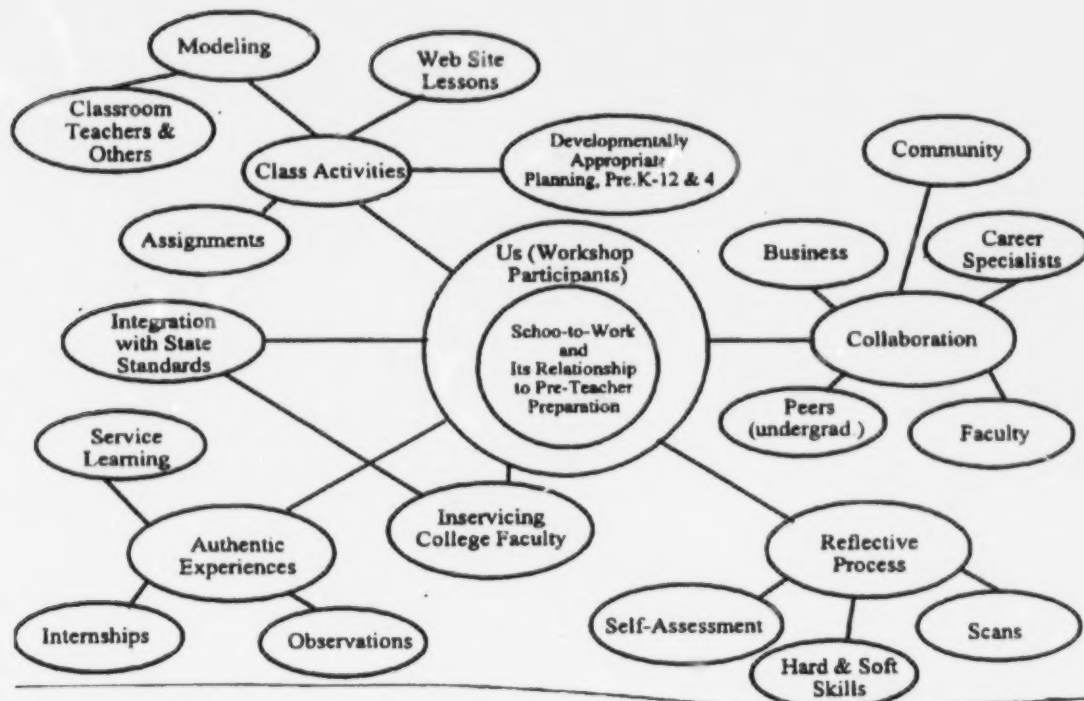
Example of Mind Mapping
To Share with Groups

Mind Map



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EXAMPLES OF MIND MAPS CREATED IN A STW CONFERENCE



K-W-L

FOR
ARTS & SCIENCES FACULTY

Dora L. Bailey
Youngstown State University
September 2000

K-W-L

A K-W-L is a strategy designed to get learners and audiences to flush out their background knowledge, assumptions, biases and prejudices so they can connect old ideas and thoughts to new knowledge and understandings and/or adjust old perceptions. There seems to be a relationship between background knowledge and the comprehension of issues and ideas under study (Tierney & Cunningham, 1984).¹ Background knowledge, or prior knowledge as some researchers call it, is "the sum of a person's previous learning and development; experience; . . . experiences which precede a learning situation, story, etc." (Harris & Hodges,² 1981. p. 29). The importance of prior knowledge in learning has developed through research based on schema theory, which states that individuals develop a cognitive, or mental, structure of what they know in their minds. Schema theory contends that a person understands what is learned through the lens of what is already known to them. A K-W-L activates learners' prior knowledge and helps them determine purposes for learning.

The "K" represents what the learner already knows about a topic or concept under study; the "L" represents what the learner wants to know; the "W" represents what the learner learned after the study. In other works a teacher, presenter, or facilitator can help an audience by getting them to respond to three questions. First, "What do I think I know about the topic under study?" Second, "What do I think I want to know about the topic under study?" After study is complete the third questions is asked, "What did I learn from studying this topic?" The three categories are arranged in a chart form and kept visible during study. See Chart on the next page.

¹ Tierney, R. J., & Cunningham, J. W. (1984). Research on teaching reading comprehension. In P. D. Pearson (Ed.), *Handbook of reading research* (pp. 609-655). New York: Longman.

² Harris, T. L., & Hodges, R. E. (1981). *A dictionary of reading and related terms*. Newark, DE: International Reading Association.

K

W

L

What we <i>KNOW</i> about contextual learning.	What we <i>WANT</i> to know about contextual learning.	What we <i>LEARNED</i> about contextual learning.

Since this is done as a small or large group activity, disagreements for what is "known" usually arise. All responses are to be recorded for all to see even responses that directly conflict with each other. It behooves learners of all ages to come to accept that people have different conceptions, misconceptions, experiences, and/or information about topics.

It is a good idea if the participants develop questions from statements in response to, "What we want to find out." Once a question has been asked, it usually presses to be answered in some fashion. It may be that all of the questions cannot be answered in the allotted time for study. In this case, the group needs to prioritize the questions. The facilitator can also indicate which questions s/he feels will be answered. Participants can explore further, on their own, for answers to question that they need answered that were not answered by a session or further sessions can be planned.

The third question is posed after the study occurs. It is a good idea for participants to actually write responses to questions posed in this part of the chart if the questions were answered by the study. This helps determine what information was learned and what still needs to be covered.

A modification of the K-W-L strategy for learning would work well with Arts & Sciences faculty studying contextual learning. The modification would be to add a fourth category "SW" which would represent "What the learner *still wants* to know." The learner could place questions in this column because the questions were not covered in the arena of study. Questions could be placed here because the arena of study actually generated more questions. This generation of new questions is not unusual with adult learners. Most adults are left with more questions than answers after being presented to and after considering a concept. Including this category to the chart, gives credibility to individuals' further questions and leaves them with a direction to take for their own independent study. See a blank recommended modified K-W-L on the following page.

For adults, it is desirable for them to keep a personal copy of the emerging K-W-L in addition to having them all see a large version as it emerges. Actually, the K-W-L represents a strategy that works with any age learner and in any content area so Arts and Sciences faculty could incorporate this strategy into their own teaching.

MODIFIED K-W-L

K	W	L	SW
What we <i>know</i> about _____	What we <i>want</i> to know about _____	What we <i>learned</i> about _____	What we <i>still want</i> to know about _____

Contextual Learning
Built Into College Freshman & Sophomore Level Courses:
Examples

Introduction

Dora L. Bailey
September 2000

Contextual Learning
Built Into College Freshman & Sophomore Level Courses: Examples

Introduction

This section includes examples of college syllabi and how they wove contextualized learning throughout their courses. Ideally contextual/work based learning means that students would go to a place of real work to see and practice the concepts under study. This is not always an option because of proximity to the real world application, lack of money, lack of real world employers and employees to guide students, etc. In case real world applications are not available, then small group projects, simulations, demonstrations by students, etc. can be considered by college and university faculty. When these options are used then it is even more important for the professor to help students connect the college based learning with the concepts illustrated by the option to a real world experience.

There is an interesting phenomenon that occurs when learners learn in a contextualized fashion. It seems that the learners see what is being taught as relevant and valuable. When they see what is being taught as relevant and valuable, the students are more likely to be attracted to the course or program. The more students are attracted to the course or program, the more relevant and valuable that course or program becomes in the real world of work. This phenomenon can be the impetus for professors to focus on contextualizing the learning experiences they plan for learners.

In general all courses can be contextualized by:

- 1) Course-Based Learning – Help students to identify and come to understand the course concepts.

2) Work-Based Learning – Help students experience real world references to the concepts under study.

- a. Interview – Talk to people who use course concepts in their world of work. Professor can script the interview. Interview can be video or audio taped for sharing with the class.
- b. Find a video clip that shows someone using one of the concepts under study.
- c. Find a print reference from the real world of one of the concepts under study.
- d. Create a way to use concept in the real world. Create a simulation of its use in the real world.

3) Connecting Activities – Help students show how they understand the concepts under study at work in the real world of work.

- a. Speech – To go with an interview report. Must connect with some concept under study with the interview report.
- b. Project - Create a way to use concept in the real world. Create a simulation of its use in the real world.
- c. Simulation – Group acting as a real world work group.

These are general suggestions for professors to consider when focusing on bringing real world context into their students' learning.

This section includes examples of how university faculty include real life learning experiences in their courses. Three of these examples include student interviews with someone in the real world who used one or more of the concepts under study. They also

include a simulated real world experience of one or more of the concepts under study. These syllabi support the School-to-Work principle that a primary role of an education is to encourage all students to prepare for active membership in tomorrow's community by looking ahead to their educational and employment opportunities. All college and university professors are educators who can concern themselves with relevancy to the real world at large.

WOMEN IN LITERATURE

Dr. Sherry Lindon
Adapted by Dora L. Bailey

Youngstown State University
September 2000

ENGLISH 2617: WOMEN IN LITERATURE
Youngstown State University
Fall XXXX

Dr. Sherry Linkon
235 DeBartolo Hall
English Dept. 742-1951
American studies Dept. 742- 2977

Prerequisite: English 551/1551 or the equivalent

Course description and goals:

Women in Literature is a general education course (a humanities course under the old program and an artistic an literary expressions course under the new system) that also serves students in some degree programs and minors. His course focuses on two "enduring understandings":

- ❖ Telling stories, reading stories, and talking about stories can help people understand their experience and the world around them.
- ❖ Around the world and in different times, women share some similar issues, but different circumstances – of time, of social position, of situation – create different possibilities, so women respond differently to those shared issues.

By the end of the semester, you should be able to demonstrate your understanding of these ideas by doing three things:

- ❖ Explain how specific literary texts comment on women's experiences – the author's experience, the character's experiences, the experiences of women like the author and her characters, and your own experiences.
- ❖ Identify the issues faced by the author and /or female characters and explain why she/they responded in particular ways
- ❖ Compare the responses of authors and/or characters from texts that represent different circumstances, and explain how they are similar and why they are different

Tests:

Norton Anthology of Literature by Women, Sandra Gelbert, ed.

Assignments & Grading:

Over the course of the semester, you will complete 5 1-page papers (20% of grade), 1 positionality essay (10% of grade), 1 integrative project (15% of Grade), 1 interview (10% of grade), 1 woman's story (15% of grade), and a learning portfolio (other things besides the above for 30% of grade). You must complete all of these assignments in order to pass the course.

5 1-page papers: no more than 1 page each, typed, double-spaced, designed to help you develop your skills in analyzing literary texts; due every Friday from September 8 to October 6.

A positionality essay: 3-5 pages, in which you will compare your situation with Toni Morrison's and her character Sula's and consider how your positionality affects your response to the novel; due November 6.

An integrative project: 5-10 pages in which you will pull together material from at least 3 course texts, classroom discussions, and your own experience to demonstrate your understanding of the central ideas of the course. I will give you a set of options to choose from for this project, or you may – with my approval – design your own. Due December 1.

An interview: in an effort to better understand the issues behind women's lives, you are asked to interview a woman using the interview schedule handed out in class. You will write a 2 page profile of this person. Include in your portfolio.

A woman's story: Find a book that documents a woman's story. Note the manner in which this woman begins her story. Use concepts of story illustrated in your readings for this class. (It is not necessary to read the whole book before the course is over) The woman's story is to be presented in small group as well as added to your portfolio.

**Option:* You may interview a woman extensively. Tell her story. Telling her story can be written or audio taped.

Note: You will not receive grades on these assignments, but I will comment on them extensively. You may rewrite any of the papers or project if you think you can do a better job. Your course grade will be based entirely on your learning portfolio, in which you will document and evaluate your own learning.

The learning portfolio: submitted once at midterm (October 20) and once at the end of the semester (December 11). The learning portfolio will help you become more aware of your own learning and help me see both your effort and what you have accomplished.

Your portfolio should include the following items:

1. An opening statement, in which you identify what you want from the course and take stock of what you already know about women and literature. Your statement should explain why you took the course, how it fits into your educational goals, why you're interested in reading women's literature, and/or what gender-related issues are important in your life. You should also explain what you already know about women and literature. You might want to write about your reading history or other women's studies courses you've taken. And if you don't know much, it's ok to say so.

I'll collect these on September 6th and return them with some comments. Remember to save your opening statement to include in your midterm and final portfolios.

2. A "learning log" in which you record your learning activities and make very brief reflective comments. Learning activities include everything you do related to this course – coming to class, reading, talking with friends, working on papers or projects, preparing your portfolio, and anything else that helps you learn (including just sitting and thinking about things). Each log entry should state what you did and what you thought about it. Here are a couple of examples of appropriate log entries:

September 8: Spent 3 hours tonight reading the first few chapters of Sula. I'm very confused about what's happening – what's real and what's imaginary? – but I like the way Morrison uses language.

November 3: I was talking with my friend Rob today, and he says that men go through a lot of the same kinds of things as women. That made me think about how much difference there really is. Maybe we should have courses about men and women in literature, not just women in literature?

Your log should include a record of your attendance I class, but please don't just summarize what we did in class each day. Use the log to show me what you're doing outside of class and to comment on how classroom activities do or do not help you learn.

3. Copies of all of your papers and projects, including my written comments and any revisions you choose to do. If you revise a paper, you might want to add a short statement explaining what you did, though you don't have to.

4. 2 reflective statements, one completed at midterm and one at the end of the semester, addressing the following questions:

- ❖ What activities and experiences, in class or outside of class, have most enhanced your learning in this course?
- ❖ How has your understanding of the "enduring understandings" deepened? Cite specific evidence from your own work to show how your understanding has deepened.
- ❖ What grade would you assign yourself? I'll give you a grading rubric to help you with this.
- ❖ What changes in this course and/ or your own learning activities would help you learn better?

I will give you a tentative midterm grade, to give you a sense of how you're doing, but the only binding grade is the final one.

Grade:

100% - 90% = A; 89% - 80% = B; 79% - 70% = C; 69% - 60 = D; 59% - 50 = F

Course Schedule

Dates	Assignments	Themes
September 4	Monday: No Class, Labor Day	Women & Writing
September 6	Wednesday: Opening statements due; Read Woolf, excerpt from "A Room of One's Own" (1338-1344)	
September 8	Friday: Short paper due	
September 11	Monday: Read Anne Bradstreet, "The Author to Her Book" (88) and Margaret Cavendish, "The Poetess's Hasty Resolution"	
September 13	Wednesday: Fanny Fern, "Mrs. Adolphus Smith Sporting the 'Blue Stocking'" (438); Florence Nightingale, from <i>Cassandra</i> , "Women's Time" (837-841); and Emily Dickinson, 613 (874).	
September 15	Friday: Charlotte Perkins Gilman, "The Yellow Wallpaper" (1133-1144); Short paper due.	
September 18	Monday: Anna Wickham, "Dedication of the Cook" (1382); Carolyn Kizer, "From Pro Femina" (1894-1895); Adrienne Rich, "I Am in Danger- Sir -" (1959-1960).	Work
September 20	Wednesday: Paule Marshall, "Poets in the Kitchen" and Alice Walker, "In Search of Our Mother's Gardens" (2315-2322)	
September 22	Friday: Short paper due	
September 25	Monday: Lora Dee Cervantes, "Cannery Town in August" (2349); Linda Hogan, "The Hands" (2326); Jamaica Kincaid, "Girl" (2335-2336); Margaret Walker, "Whores" (1737); and Alice Dunbar-Nelson, "I Sit and Sew" (1308)	
September 27	Wednesday: Rebecca Harding Davis, "Life in the Iron-Mills" (919-944)	
September 29	Friday: Mary Astell, "Ambition" (189); Ana Letitia Barbauld, "Washing-Day" (226-228); Short paper due	
October 2	Monday: Charlotte Bronte, <i>Jane Eyre</i> (472-676)	Relationships- motherhood
October 4	Wednesday: More on <i>Jane Eyre</i>	
October 6	Friday: Short paper due	
October 9	Monday: <i>Jane Eyre</i> (676-784)	
October 11	Wednesday: Susan Glaspell, <i>Trifles</i> (1351-1360)	
October 13	Friday: TBA	
October 16	Monday: Frances Ellen Watkins Harper, "The Slave Mother" (845-846) and Louisa May Alcott, from <i>Little Women</i> (946-960)	Relationships- motherhood
October 18	Wednesday: Meridel Le Sueur, "Annunciation" (1587-1594) and Anais Nin, "Birth" (1624-1627)	
October 20	Friday: TBA	

October 23	Monday: Hisaye Yamamoto, "Seventeen Syllables" (1834-1843) and Edna O'Brien, "A Rose in the heart" (2101-2120)	
October 25	Wednesday: Audre Lorde, "Now That I Am Forever With Child" (2129-2130); Margaret Atwood, "Spelling" (2216-2217); and Cathy Song, "The Youngest Daughter" (2363-2364)	
October 27	Friday: <i>share in small group Women's Story assignment.</i>	
October 30	Monday: Read <i>Sula</i> , Part One	Relationships-Friendship
November 1	Wednesday: More of <i>Sula</i>	
November 3	Friday: More of <i>Sula</i>	
November 6	Monday: Read all of <i>Sula</i> ; Positionality essay due	Relationships-love, marriage, and sexuality
November 8	Wednesday: Angela Carter, "The Company of Wolves" (2232-2238)	
November 10	Friday: No class, Veteran's Day	
November 13	Monday: Margery Kempe, "(On Female Celibacy)" (19-24); Isak Dinesen, "The Blank Page" (1391-1394); and Flannery O'Connor, "Good Country People" (1880-1893)	
November 15	Wednesday: Anne Bradstreet, "To my Dear and Loving Husband" and "A Letter to Her Husband" (88-89); Mary Elizabeth Coleridge, "Marriage" (1148-1149); and Amy Lowell, "Venus Transiens" and "Madonna of the Evening Flowers" (1265-1266)	
November 17	Friday: Tillie Olsen, "Tell Me a Riddle" (1702-1728)	
November 20	Monday: Kate Chopin, <i>The Awakening</i> (1013-1076)	
November 22	Wednesday: <i>The Awakening</i> (1076-1101)	Your choice-small groups will select themes & readings and lead class discussions
November 24	Friday: No class. Thanksgiving	
November 27	Monday: Form groups and begin planning work	
November 29	Wednesday: Group work day	
December 1	Friday: Group 1 presents, reading assignments to be announced; Integrative project due	
December 4	Monday: Group 2 presents, reading assignments to be announced	
December 6	Wednesday: Group 3 presents, reading assignments to be announced	
December 8	Friday: Group 4 presents, reading assignments to be announced	
December 11	Monday: Final portfolios due	

Tips, Policies, and Advice

Please type all of your papers, using standard font, and edit your work carefully.

If you are unable to complete the course requirements, you may be eligible to take an incomplete grade. You must have completed the majority of the assignments and earned at least a C. If you take an incomplete, you have to complete the assignments. After one year, the "I" will translate into an "F."

Plagiarism occurs when you present work that you did not create as if it were your own. This includes not only submitting whole papers that you did not write but also using text or images

that you locate on websites or in print sources without proper attribution. You may quote, paraphrase, or summarize materials that you find elsewhere, as long as you indicate clearly where the material came from and document the quotation, reference or ideas appropriately. you must provide documentation even if you change the phrasing of a text. If you do not, you will receive an "F" on the assignment in question and possibly fail the entire course. If you are ever unsure about whether something should be documented, document it. If you're not sure if you're incorporating outside evidence appropriately, ask me.

If you have a learning disability and need assistance or other accommodations, please talk with me early in the semester. I can provide help or refer you to others who can be more helpful.

Let me know how I can help you. If you have questions, feel free to ask, I class, by phone, or by e-mail. Stop by and visit during office hours or at other times. One of the greatest pleasures of my work is talking with students, and whenever my door is open, I hope you'll feel welcome to drop in.

This course is a "safe zone." It's possible, even likely, that we will discuss some very personal issues during this course, so nothing anyone says about his/her personal experience should leave this room. In addition, even (or perhaps especially) when you disagree with others, I expect you to treat each other with respect. If you would like assistance with issues such as sexual harassment, discrimination on campus, or any issues that emerge in class, please come talk with me. If I can't help you I can find someone who can.

Woman's Story Rubric

	1	2	3
Story	The person sharing the story 'told' the story.	The person sharing the story relayed the story with interest and excitement.	The person sharing the story relayed the story in an interesting manner maybe using prompts, voice, etc.
Technique of story	The person sharing the story 'told' about the way the woman told her story.	The person sharing the story posed possible reasons for the way the woman told her story. Related this way of telling story with story telling techniques (ways) experienced in this class.	The person sharing the story compared and contrasted this manner (way) of story telling with other women's storied from class.
Interaction	The person sharing the story invited interaction at the end of the sharing.	The person sharing the story asked for interaction from the listeners several times during the story sharing.	The person sharing the story asked for interaction from the listeners throughout the story sharing almost as if it were a natural part of the sharing an conveying of this woman's story telling manner.

Each listener will rank the person sharing. The listener will also provide evidence for the ranking on this sheet. This will be done immediately after the sharing is complete.

Interview of a Woman

In an effort to help you understand how being a woman implies certain issues and concepts, you are asked to interview any woman who may understand how the fact that she is a woman effects the performance of her job. It is your responsibility to make sure that the person interviewed does routinely make some non-trivial statements of understanding.

After you have arranged for the interview, introduce yourself and explain that you are studying women in literature and are learning to bring concepts and issues facing women to foreground of your thinking. Indicate that your purpose for the interview is to find out how women feel about her job in terms of being a woman. How does her gender effect her successful performance of her job. Be sure to ask the following questions, but feel free to follow up on interesting things the interviewee says or on other questions that come to mind. Note that some suggestions or reminders are included below in italics.

Take extensive notes during your interview. You may want to ask the interviewee for permission to record the interview. Finally, write a 2 page occupational profile of the person you interviewed. Base the profile both on the information obtained (1 page) in the interview as well as your own interpretation (1 page) of this information. Turn in your notes (or tape) and a typed copy of the profile.

1. What is your name?
2. What is your occupation? Please explain what you do.
1. Did you attend college to train for this occupation? If not, have you received other post-secondary training, including on-the-job training, to help you do your job? At the time of your training for this job what kinds of gender issues surfaced? *If the interviewee does not do so, ask him/her to describe any post-secondary education or training.*
2. Has any of your training been different because of your gender? If so, please describe the training. *You may have to probe or give examples. You may also have to come back to this question after asking later questions.*
3. Describe the kinds of skills and manners that you use in your job that you feel are gender specific. Explain how you use them. *You may have to give examples or explanations. Take cues from the interviewee as to how much explanation is needed or appropriate.*
Eyes down cast, Smiling, Deferring, Taking the minutes, Being responsible for food and/or decorations, Being asked to be aggressive like a man, etc.
4. If I were to do your job, what do you suggest I understand of these concepts and issues? Why?
5. How important is an understanding or use of the concepts and issues you have told me about to your successfully performing your job?
6. Are there any other things you would like to tell me related to your job and gender?
7. *Thank the interviewee for his/her time, and offer to give him/her a copy of your report when you have completed it.*

Youngstown State University

Department of Mathematics and Statistics

Course Syllabus for Mathematics 3767

Title: Integrated Algebra / Geometry / Calculus for Middle School Teachers I

Credit: 4 s.h.

Description: An integrated, conceptual, and function-centered approach to elementary and intermediate algebra for preservice middle childhood mathematics specialists. Emphasis on multiple approaches and representations, problem solving, and communication of mathematical reasoning. Includes inquiry based laboratory experiences. Not applicable to the mathematics major.

Prerequisites: Math 2665 (or Math 666 under the quarter system).

Text: *Concepts in Algebra, A Technological Approach*, Fey, Heid, Good, Sheets, Blume, and Zbiek, Everyday Learning.

Calculator: A graphing calculator is required. The TI-73 or TI-83 Plus is recommended.

Text coverage: All (Chapters 1-9).

Goals: In this sequence of courses (Math 3767 and 3768) future middle childhood mathematics specialists significantly extend their mathematics education beyond that traditionally required of K-8 generalists. In particular:

1. The conceptual and skill objectives for students in this sequence might be thought of as those which would well prepare you to teach Honors Algebra in the eighth grade. Implicit in this statement is the recognition that being well prepared to teach such a class implies a good understanding of mathematics related to, but well beyond, that which would typically be in it.
2. Students will extend the mathematical thinking objectives developed in the *Foundations of Middle School Mathematics* sequence in several ways. New tools of problem-solving, reasoning, representing information, and oral and written communication will be developed that are appropriate for the more sophisticated mathematical content of this course. Inductive thinking as used in the Math 1564/2665 sequence will continue to be developed, but a new level of mathematical thinking will receive increased emphasis, namely your ability to confidently know whether or not a mathematical argument that you present is complete.
3. Students will extend their understanding of technology to that appropriate for the more sophisticated mathematical concepts of this sequence. You will become proficient users of graphing calculators and spreadsheets. New technology appropriate for the integration of mathematics and science, such as calculator-based

laboratories for gathering and analyzing data, will be introduced, as will Computer Algebra Systems. Understanding the connections among the many approaches to understanding functions and technological tools will be of utmost importance.

Topics: The specific mathematics topics covered in this course, from the points of view described above, include:

1. Multiple representations of functions, including:

- a) verbal descriptions from the context of applications,
- b) diagrams,
- c) tables,
- d) graphs, and
- e) many equivalent symbolic forms.

Students will be expected to translate information from any of these forms to the others and to be able to use any of the non-verbal representations to solve application problems.

2. A conceptual understanding of, and fluency in calculation with, various types of functions and relations such as:

- f) linear,
- g) quadratic, square root, and absolute value,
- h) exponential and logarithmic, and
- i) rational.

With all of these types of functions, students will explore properties such as domain and range, composition of functions and the existence of inverses and partial inverses, and implicitly and recursively defined functions.

Assessment: Students will be assessed through a variety of means including tests, quizzes, homework, oral presentations and demonstrations, and written projects. The specific mix of assessment tools will be left to the instructor. Students will be expected to:

- 1. Demonstrate their ability to solve standard and inverse problems related to the mathematics covered in the course.
- 2. Demonstrate their ability to represent fundamental mathematical concepts and ideas in a variety of ways using symbols, diagrams, pictures, charts, etc.
- 3. Demonstrate their ability to connect the mathematics covered in the course to applications of mathematics and to related topics within mathematics.
- 4. Demonstrate their ability to make effective use of mathematical technology to demonstrate results, solve problems, and explore problem situations.
- 5. Demonstrate their ability to reason with the mathematical ideas of the course by finding patterns, making explanations and writing short proofs.

Grading: Attendance and participation will be graded on a weekly quiz or homework assignment. Every unexcused absence will result in some points deducted from the quiz or homework assignment.

1. There will be between 50 and 100 points for homework and quizzes.
2. The shed project and interview will be worth 75 points.*
3. There will be three 50 point exams.
4. The final exam will be worth 100 points.

90% of the total points possible will guarantee you an A,
80% of the total points possible will guarantee you at least B,
70% of the total points possible will guarantee you at least C,
60% of the total points possible will guarantee you at least D.

*The inclusion of this problem represents an adaptation of the departmental syllabus. In completing this project – A Simulated Real World Mathematical Problem: “The Shed” – students must apply all of the concepts listed under topic 1 above as well as many of the concepts listed under topic 2. This project also integrates all 5 of the expectations included in the assessment statement.

A Simulated Real World Mathematical Problem

"The Shed"

Notes to the Instructor

The organization of the Shed Problem into separate activities allows the instructor to assign this problem as a project completed entirely out of class or completed partially in class. Although it is not absolutely necessary, it is suggested that Activity Sheet 6 be completed as an out-of-class assignment. Only Activity Sheet 7, the interview, must be completed outside of class. Activity Sheets 8 and 9 extend the ideas in the preceding activities. If the project is to be completed partially in class, one class period of approximately 50 minutes should be allowed for each in-class activity. Students should work on the project in groups of two or three. The nine activity sheets provide directions and questions to be addressed in completion of the project; however, the space provided for answers may not be sufficient. The instructor should decide on the format of the completed project as well as the number of points allocated for each activity. Group presentations and/or displays of project results is a highly desirable option, especially for the results of Activity Sheets 6 and 7.

The following may serve as guidelines for discussion when activities are completed in class, may be used to give direction to students who have difficulty making progress on the assignment, or may direct a summarizing class after all students have handed in the assignment.

Define functions:

$Y_1 = 150/(.5X^2)$ Volume is divided by the area of the base to get the height.

$$Y_2 = 2(2*.5**X^2)+1*X*(300/X^2)+8*X*(300/X^2)+4*(\sqrt{2}*X)*(300/X^2)$$

Cost of the shed is \$2 times the area of the ends plus \$1 times the area of the back plus \$8 times the area of the floor plus \$4 times the area of the roof.

$Y_3 = Y_2 - 600$ A function defined for ease of viewing height of the shed and total cost.

Some things to do with Y_1 and Y_2 . Have students:

Write the functions in words.

Look at each of the TABLEs and see what happens to the variables Y_1 and Y_2 .

Using the TABLEs, describe in words what happens to Y_1 and Y_2 as X varies from 0 to 20, e.g. when X gets larger, the height gets smaller so that the shed will hold 150 cubic meters, and the cost of this shed

Think about why these patterns make sense, i.e. as the leg gets larger, the slant gets larger; as the leg gets larger, the height gets smaller (keeping 150 cubic meters as the volume).

TRACE the functions to see what happens to height and cost as X varies from 0 to 25.

Using TRACE, describe in words what happens to Y_1 and Y_2 as X varies from 0 to 20.

Sketch the Y_1 and Y_2 on graph paper and label everything carefully.

Find the cheapest shed using TABLE and integer values for X .

Find the cheapest shed using TABLE and smaller increments for X . Find the cheapest shed to the nearest penny. What leg gives this?

Use TRACE to find the cheapest shed; depending on the WINDOW, students may get different values. What leg gives this?

Use MIN from the CALCULATE menu to find the cheapest shed. What leg gives this?

Concepts applied in the Shed Problem:

The Shed Problem integrates and applies many of the topics treated in Mathematics 3767; among others, the following concepts are addressed in the problem:

1. Multiple representations of functions, including:

- a) verbal descriptions from the context of applications,
- b) diagrams,
- c) tables,
- d) graphs, and
- e) many equivalent symbolic forms.

Students will be expected to translate information from any of these forms to the others and to be able to use any of the non-verbal representations to solve application problems.

2. A conceptual understanding of, and fluency in calculation with, various types of functions and relations such as:

- f) linear,
- g) quadratic, square root, and,
- h) rational.

With these types of functions, students will explore properties such as domain and range.

The Shed Problem - Activity Sheet 1

ABC Company wants to build a storage shed that will be attached to the side of an existing building. The shed will have isosceles right triangular ends and a rectangular roof that will slant from the existing building all the way to the ground. The floor of the shed must be made of moisture resistant material that costs \$8/square meter; the roof of the shed will be made of somewhat less durable material costing \$4/square meter; the triangular ends of the shed will be made of material costing \$2/square meter; the back of the shed, that is against the building, can be made of inexpensive material that costs \$1/square meter. The shed needs to hold 150 cubic meters of biodegradable packing material. How should ABC Company construct the shed so that it spends as little as possible?

Discuss the problem in your group:

What is confusing?

What things do you need to know in order to begin solving the problem?

If you don't remember something you need, how do you find out? For example, how do you find out what an isosceles right triangle is?

Sometimes building an actual model can help you to solve problems. How could building a model help you to understand and solve the problem of building the least expensive shed?

If you don't know the dimensions for the "real" shed, how would you know how large to make the model?

What things about a model and the "real" shed will be the same?

What things about a model and the "real" shed will be different?

The Shed Problem - Activity Sheet 2

Build a model of the shed from colored poster board, one color for each type of building material. Use yellow for the floor of the shed (material that costs \$8/square meter), red for the roof of the shed (material costing \$4/square meter), green for the triangular ends of the shed (material costing \$2/square meter), and orange for the back of the shed (material that costs \$1/square meter).

Now that you have a model for the shed, explain how to figure out how much the shed holds?

A picture may also help you to understand the problem of finding the shed that will cost the least. Make a sketch of the shed on the back of this paper. What difficulties do you have in making such a sketch?

What difficulties do you have in interpreting such a sketch?

What information is more easily conveyed by a physical model than by a sketch on paper?

What advantages does your picture have over your physical model of the shed?

Discuss general ideas you have about how to make a shed that costs as little as possible with the other members of your group. Summarize your discussion and any tentative conclusions you reached.

The Shed Problem - Activity Sheet 3

Suppose each of you were to build a shed but didn't worry about how much it holds. Use your model as an example: measure each length to the nearest centimeter and calculate the cost based on \$8/square centimeter for the floor, \$4/square centimeter for the roof, \$2/square centimeter for the ends, and \$1/square centimeter for the back.

Find the cost of the roof in your model.

Write an expression that will always give you the cost of any rectangular roof. Write the expression in words. Write the expression using symbols for words; be sure to define your symbols.

Write similar verbal, numerical, and symbolic expressions for the cost of each part of the shed.

How do you find the total cost of the shed?

Suppose you change the dimensions of your shed. How do you find the cost now?

The Shed Problem - Activity Sheet 4

How many **different** linear dimensions are there in your model of the shed? Why is this true?

Choose dimensions for some (at least two) "real" sheds, and find the cost of the sheds with these dimensions. Organize your data in a chart on graph paper so that you have recorded each of the appropriate linear dimensions, each of the appropriate areas, the cost of each of the appropriate areas, and the total cost of the shed.

How do you find out how much each of these sheds holds?

Do the sheds recorded in your chart hold the amount of packing material required by the company? If the model you constructed were a scale model for a real shed -- with 1 centimeter standing for 1 meter -- would that shed hold the correct amount of material?

If the sheds above do not hold the required amount of material, how do you find some dimensions that work?

If any of the sheds does hold the required amount of material, do you have the least expensive shed? If so, how do you know?

You might design inexpensive sheds and see which of them hold the amount of material required or you might design sheds that hold the amount of material required and see which of them is the least expensive. Which method do you think might be the most profitable? Why?

Can you use any of the expressions written earlier to make sure that a shed you design is the least expensive shed? Why or why not? Can you use any of the expressions written earlier to make sure that a shed you design holds the required amount of material? Why or why not? Write any appropriate expressions in words, numbers, and symbols.

The Shed Problem - Activity Sheet 5

After you have tried several dimensions for sheds that hold the required amount of material, how could you arrange those dimensions so that your search for the least expensive shed might be easier?

How would you then go about finding the least expensive shed that holds the required amount of material? Can you find a way of getting a reasonably good answer to the problem?

Once you have a method for finding a good answer to this problem, you might do one or more of the following to help you understand the problem further:

- a. Graph the dimensions of some sheds, e.g. the height of the back wall on the x-axis and the length of the back wall on the y-axis. What does the graph show?
- b. Graph one dimension of the shed on the x-axis and the cost of the shed on the y-axis. What dimension should you use? What does the graph show?
- c. Program the calculator to take a value for the height of the back wall and give the length of the back wall and the total cost of the shed.
- d. Use a spreadsheet to model the problem. This spreadsheet model could appear very much like a chart that you might use to arrange data in previous calculations or it might be a what-if analysis that more closely resembles a calculator program.

What happens if you remove the condition that the triangular ends are isosceles?

The Shed Problem Applied - Activity Sheet 6

Create an application patterned after the Shed Problem that is appropriate for the level of student you are preparing to teach. Your application should be turned in on a diskette in Word format so that copies can be made and distributed to your classmates. Include the following items in your application.

1. Identify the grade level of the students for whom the application is intended.
2. Specify the number of students in each group and the conditions under which the assignment will be completed.
3. Provide a verbal context or story that sets the stage for the problem. Make sure the verbal context provides sufficient information to solve the problem and clearly states the problem to be solved. It is not necessary that the statement of the problem be fully explicated before the students are asked to do something. For example, you could have the students build a model before you ask questions that lead to numerical or symbolic statements.
4. Give necessary directions for construction of a model of the problem.
5. Delineate questions that lead students to the solution of the problem. Make sure that some of the questions require diagrams, tables or graphs and that some require written explanations. If symbolic representations are appropriate at the grade level you choose, include questions requiring these as well.
6. Give instructions for a presentation of the group projects to the class.

The Shed Problem Interview - Activity Sheet 7

In an effort to help you understand how the mathematical concepts and technology used in this course are applied in various occupations, you are asked to interview someone who makes some use of these mathematical ideas and tools in performing his/her job. It is your responsibility to make sure that the person interviewed does routinely make some non-trivial use of mathematics.

After you have arranged for the interview, introduce yourself and explain that you are studying mathematics and are learning many concepts and making extensive use of technology. Indicate that your purpose for the interview is to find out how these concepts are used in his/her job and what he/she feels about the role of these concepts/technology in successfully performing his/her job. Be sure to ask the following questions, but feel free to follow up on interesting things the interviewee says or on other questions that come to mind. Note that some suggestions or reminders are included below in italics.

Take extensive notes during your interview. You may want to ask the interviewee for permission to record the interview. Finally, write a 2 to 3 page occupational profile of the person you interviewed. Base the profile both on the information obtained in the interview as well as your own interpretation of this information. Turn in your notes (or tape) and a typed copy of the profile.

1. What is your name?
2. What is your occupation? Please explain what you do.
3. Did you attend college to train for this occupation? If not, have you received other post-secondary training, including on-the-job training, to help you do your job? *If the interviewee does not do so, ask him/her to describe any post-secondary education or training.*
4. Has any of your training been of a mathematical nature? If so, please describe the training. *You may have to probe or give examples. You may also have to come back to this question after asking later questions.*
5. Do you use any of the following ideas, concepts, or tools in your job? If so, explain how you use them. *You may have to give examples or explanations. Take cues from the interviewee as to how much explanation is needed or appropriate.*

Ways of representing mathematical/numerical ideas or relationships:

- verbal descriptions
- diagrams or pictures
- tables of values
- graphs
- symbolic expressions or equations

Types of functions or relationships:

- linear
- quadratic
- square root and absolute value
- exponential and logarithmic
- rational

Types of technology:

- calculators
- graphing utilities including calculators and/or computer programs
- spreadsheets .

6. If I were to do your job, what do you suggest I understand of these concepts? Why?
7. How important is an understanding or use of the concepts you have told me about to your successfully performing you job?
8. Are there any other things you would like to tell me about the use of mathematical concepts and related technology in your job?
9. *Thank the interviewee for his/her time, and offer to give him/her a copy of your report when you have completed it.*

The Shed Problem Revisited - Activity Sheet 8

ABC Company's own storage shed was so popular that it opened a new division, Ready-Made Sheds, to mass produce storage sheds for sale to the public. Recall that these sheds are attached to the side of an existing building and have triangular ends and a rectangular roof. The purchase of raw materials in quantity has reduced the cost of making each shed. The floors of the sheds are made of moisture resistant material that costs \$6.50/square meter; the roofs of the sheds are made of somewhat less durable material costing \$3.25/square meter; the triangular ends of the sheds are made of material costing \$1.95/square meter; the backs of the sheds (against the building) are made of material which costs \$0.65/square meter. Each shed holds 150 cubic meters of biodegradable packing material; the mechanism by which this material gets into the shed is still a mystery. Naturally, Ready-Made Sheds wants to spend as little as possible to construct each shed. Oops! I almost forgot; we now need to add labor to the cost of each shed.

Ready-Made Sheds has decided to make two models of its product. The triangular ends of the first model, Lean-1, are still isosceles. Since it is difficult to find employees who understand the word isosceles, the cost of labor for each of these sheds is \$475. Write a program that takes the length of the leg of the isosceles triangle as input and gives the other linear dimensions of the shed, as well as the cost of the shed, as output. Graph the cost function and find the dimensions and cost of the least expensive shed.

Cost function:

Cost of the least expensive shed:

Dimensions of the least expensive shed:

ANATOMY & PHYSIOLOGY CURRICULAR CONNECTIONS TO
THE ALLIED HEALTH SCIENCE PROFESSIONS

J. Krontiris- Litowitz

Youngstown State University

This curricular package provides examples of contextual learning in Anatomy & Physiology* (BIOL 1545) at Youngstown State University. It contains activities that augment classroom lectures and provide a connection between course content and professional application. While the content focus of this package is the Cardiovascular Science Unit, the activities are applicable to entire the course and in fact are developed for all curricular units.

*This course serves students in allied health professions such as emergency medical technician, medical assisting technologists, and respiratory care practitioners.

CONTENTS

1. Course Syllabus
2. Lecture outline - Cardiovascular Sciences Unit only
3. Interview with and Allied Health Science Professional
4. Case Studies Assignment (Bonus Credit)
5. Lab 9 Electrocardiogram lab
6. Lab 10 Blood Pressure lab

BIOLOGY 1545 – ANATOMY & PHYSIOLOGY I
Youngstown State University
Fall XXXX

Credit: 5 semester hours
Contact Hours: 4 lecture hours/week
2 lab hours/week
Instructor: Dr. J. Krontiris-Litowitz
Office: Ward Beecher, Room 4063
Phone: 742-3572 or 742-3601
Office Hours: XXXX
Course Website: XXXXXXXX
Prerequisite: High school chemistry and biology
Required Text: Principles of Anatomy and Physiology, by Gerald Tortora and Sandra Reynolds Grabowski, 8th edition

Course Description: A one semester course which surveys the structure and function of the human body. This course will serve students enrolled in the allied health science professions. Topics include histology, tissues, the integumentary system, the musculature, bones and osseous tissues the nervous system, the endocrine system, the blood and the cardiovascular system, the respiratory system, the digestive system, and the urinary system.

Course Objectives: By the end of the class the student should:

- 1) Understand how organ systems contribute to whole body homeostasis.
- 2) Understand basic concepts of physiology and recognize how they apply to the function of organ systems.
- 3) Know the structures of the organ systems and their respective locations.
- 4) Know the type of cells that make up the structures of the organ systems and understand how they contribute to the function of the organ system.
- 5) Understand what happens when an organ system does not function and recognize the clinical symptoms produced.

CLASS SCHEDULE

WEEK	TOPIC	CHAPTERS
1	Introduction to the Human Body	1
	Chemical Level of Organization	2
	Cellular Level of Organization	3
2	Tissue Level of Organization	4
3	The Integumentary System	5
4	Bone Tissue EXAM I	6
5	The Skeletal System: Axial (Anatomy of these The Skeletal System : Appendicular chapters to be Articulations covered in lab)	7 8 9
6	Muscle Tissue The Muscular System (Anatomy to be covered in lab) Nervous Tissue EXAM II	10 11 12
7	Nervous Tissue Spinal Cord and Spinal Nerves Brain and Cranial Nerves	12 13 14
8	Brain and Cranial Nerves Sensory, Motor Systems Special Senses EXAM III	14 15 16
9	Autonomic Nervous System Endocrine System	17 18
10	The Cardiovascular System : Blood The Cardiovascular System: Heart EXAM IV	19 20
11	The Cardiovascular System: Heart The Cardiovascular System: Blood Vessels	20 21
12	The Lymphatic System	22
13	The Respiratory System EXAM V	23
14	The Digestive System Interview Project due Friday	24
15	The Urinary System Fluid and Electrolyte Balance Bonus Case Study Project Due	25 26
16	EXAM WEEK -----EXAM VI	

FINAL GRADE to be calculated as follows:

Exam I	11% total grade
Exam I	11% total grade
Exam III	11% total grade
Exam IV	11% total grade
Exam V	11% total grade
Exam VI	11% total grade
Interview with Allied Health Professional	14% total grade
Lab	20% total grade
TOTAL*	100%

*Students may earn bonus points by turning in a case study. Students can get a copy of the case studies at the Reserve Section of Maag Library or download them from the website.

EXAMINATIONS:

Exam I covers lecture material for Chapters 1, 2, 3, 4, 5,6

Exam II covers lecture material for Chapters 7,8,9,10,11.

Exam III covers lecture material for Chapters 12,13,14,.

Exam IV covers lecture material for Chapters 15,16,17,18.

Exam V covers lecture material for Chapters 19,20,21,22.

Exam VI covers material for Chapters 23,24,25,26.

Exam questions will be multiple choice. Your presence at exams is required. If you do not attend the exam, you must talk to Dr. Litowitz (at 742-3601 or 742-3572) before the exam or you will receive an "F" (or 0%) for the exam. There will be no make-up exams unless:

- 1) Student secures a physician's release that the student was unable to attend the exam because he/she was ill. The release must be on the physician's official letterhead with the physician's signature.
- 2) Student secures release from the YSU Health Center stating that the student was ill at the time of the exam.

INTERVIEW

In an effort to better understand the application of Anatomy & Physiology to the Allied Health Science professions, students are asked to interview someone who is working in their chosen profession. Instructions will be handed out in class and can be found on the course website

LECTURE OUTLINE FOR ANATOMY & PHYSIOLOGY (BIOL 1545)
FALL, 200X

Instructor: Dr. J. Krontiris-Litowitz
Dept. Biological Sciences
Youngstown State University
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Chapter 20 - Heart

- I. Anatomy of Heart Wall
 - A. Pericardial layer
 - B. Serous layer
 - C. Pericardial cavity
 - 1. pericardium
 - D. Epicardium
 - 1. Epicarditis
 - E. Myocardium
 - 1. Myocarditis
 - F. Endocardium
 - 1. Endocarditis
- II. Great Vessels
 - A. Superior vena cava
 - B. Inferior vena cava
 - C. Coronary sinus
 - D. Pulmonary trunk
 - 1. Right/left pulmonary artery
 - E. Pulmonary veins
 - F. Aorta
 - 1. Ascending
 - 2. Coronary arteries
 - 3. Aortic arch
 - 4. Thoracic aorta
 - 5. Abdominal aorta
 - 6. Angiography
 - 7. Cardiac catheterization
 - G. Ductus arteriosus
 - 1. Ligamentum arteriosum
- III. Heart Chambers
 - A. Atria
 - 1. Auricle
 - B. Ventricle
 - C. Atrioventricular valves (A-V valves)
 - 1. Mitral/Bicuspid
 - 2. Tricuspid
 - 3. Papillary muscles
 - 4. Chordae tendineae
 - D. Semilunar valves
 - 1. Congenital defects
 - 2. Rheumatic valvular lesions
- IV. Histology of Heart Cells
 - A. Intercalated discs
 - 1. Desmosomes
 - 2. Gap junctions

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B. Functional syncitium

V. Conduction system

- A. Sinoatrial node (SA node)
- B. Atrioventricular node (AV node)
- C. Internodal pathways
- D. A-V bundle/Bundle of His
- E. Pukinje fibers
- F. Heart block

VI. Electrical Properties of the Heart

- A. Action potential
- B. Calcium channels
 - 1. Fast
 - 2. Slow
- C. Verapamil
- D. Differences between heart and skeletal muscle
 - 1. All-or-none law
 - 2. Stimulation of muscle
 - 3. Refractory period

VII. Electrocardiogram

- A. Diagram
- B. Arrhythmias
 - 1. atrial
 - 2. ventricular
- C. Premature ventricular contraction
- D. Ectopic focus

VIII. Cardiac Cycle

- A. Systole
- B. Diastole
- C. Ventricular filling
- D. Ventricular systole
 - 1. Isovolumetric contraction
 - 2. Ventricular ejection
- E. Isovolumetric relaxation
 - 1. Dicrotic notch
- F. Cardiac Arrest

IX. Hemodynamics

- A. Stroke volume (SV)
- B. End diastolic volume (EDV)
- C. End systolic volume (ESV)
- D. Cardiac output (CO)
- E. CO
 - = SV x HR
 - = 72 ml x 72 beats/min
 - = 5040 ml/min

F. Cardiac reserve

X. Control of Heart Function

A. Intrinsic

1. Starling's law of the heart

a. Length versus tension

B. Extrinsic control

1. Autonomic

a. Heart rate

1). Parasympathetic

2). Vagus

3). Acetylcholine

4). Sympathetic

5. Norepinephrine

b. Contractility

1). Sympathetic

2). Epinephrine

2. Baroreceptors

a. Location

b. Reflex

3. Hormones

a. Epinephrine

b. Thyroxin

XI. Terms

A. Bradycardia

B. Tachycardia

C. Congestive heart failure

1. Myocardial infarct

2. Atherosclerosis

D. Pulmonary congestion

E. Peripheral congestion

F. Arrhythmia

G. Fibrillation

1. atrial

2. ventricular

3. defibrillator

Chapter 21 - Blood Vessels

I. Anatomy of Generic Vessel

- A. Tunica intima
 - 1. Function
 - 2. Squamous epithelium
- B. Tunica media
 - 1. Function
 - 2. Smooth muscle/elastin fibers
 - 3. Control
- C. Tunica adventitia
 - 1. Function
 - 2. Collagen fiber network

II. Arteries

- A. Function
- B. Elastic arteries
 - 1. Function
 - 2. Characteristics
 - 3. Atherosclerosis
- C. Muscular arteries
 - 1. Function
 - 2. Characteristics

III. Arterioles

- A. Characteristics
- B. Function

IV. Capillaries

- A. Characteristics
- B. Function
- C. Location
- D. Fenestrated capillaries
- E. Continuous capillaries
 - 1. Tight junctions
 - 2. Intercellular clefts
- F. Sinusoids
- G. Anatomy of capillary bed
 - 1. Terminal arteriole
 - 2. Meta arteriole
 - 3. Throughfare channel
 - 4. Postcapillary venule
 - 5. Precapillary sphincter

V. Venules

- A. Characteristics

VI. Veins

- A. Function

- B. Characteristics
 - 1. Varicose veins
- C. Venous sinus
 - 1. Dural
 - 2. Coronary

VII. Blood Pressure

- A. Blood pressure
- B. Peripheral resistance
 - 1. Viscosity
 - 2. Vessel length
 - 3. Diameter
- C. Blood flow = $\frac{\text{difference in pressure}}{\text{peripheral resistance}}$

$$F = \frac{DP}{R}$$

- D. Systolic pressure
- E. Diastolic pressure
- F. Mean arterial pressure
- G. Change in blood pressure from heart to capillaries
- H. Auxillary systems aid venous return
 - 1. Skeletal muscle pump
 - 2. Respiratory pump
- I. Regulation of blood pressure
 - 1. Cardiac output = heart rate x stroke volume
 - 2. Nervous system
 - a. Reflex
 - b. Components of reflex
 - 1). Baroreceptors
 - 2). Chemoreceptors
 - 3). Afferent fibers
 - 4). Vasomotor center in medulla
 - 5). Vasomotorfibers
 - 3. Endocrine system
 - a. Adrenal hormones
 - b. Atrial naturetic factor
 - c. Antidiuretic hormone
 - d. Endothelium-derived factors
 - 1). Endothelin
 - 2). Endothelin-derived relaxing factor
 - e. Alcohol
 - 4. Renal regulation
- K. Clinical aspects
 - 1. Ansculatory method
 - 2. Sphygomomanometer
 - 3. Hypotension
 - a. Orthostatic

- b. Chronic
- 4. Hypertension
 - a. Primary essential
 - b. Secondary

VIII. Circulation/Flow

- A. Velocity
- B. Autoregulation
 - 1. Stimuli
- C. Myogenic response
- D. Reactive hyperemia
- E. Exercise hyperemia
- F. How nutrients and gases move from blood to tissues
- G. How fluid moves in and out of blood vessels
 - 1. Blood pressure at arteriolar end of capillary bed
 - 2. Blood pressure at venule end of capillary bed
 - 3. Interstitial hydrostatic pressure
 - 4. Osmotic pressure
 - a. Capillary osmotic pressure
 - 5. Fluid movement
- H. Circulatory shock
 - 1. Hypovolemic shock
 - 2. Vascular shock
 - 3. Cardiogenic shock

BIOLOGY 1545 – ANATOMY & PHYSIOLOGY
Youngstown State University
Dr. J. Krontiris-Litowitz
Fall XXXX

INTERVIEW WITH ALLIED HEALTH SCIENCE PROFESSIONAL

As an allied health science professional likely that you will use the concepts and vocabulary routinely in your job. In an effort to help you understand how you will use this information, you have been asked to interview someone who has a position similar to one you expect to have.

On the following page you will find a list of questions to ask during your interview. Use this page to write down the answers and take notes on the interview. Below are some guidelines for the interview.

- During the interview you will ask the person about terms that you have learned in A&P. It would be wise to review your class notes, textbook, or lecture outline before the interview so that you are familiar with terms.
- At the beginning of the interview, explain what you are doing and why you are doing it (ie., I'm taking Anatomy & Physiology and I hope to be a Medical Technologist. I'm interviewing you today to see how you might use A&P in your job.).
- The interview should last at least 15 minutes. It can last longer if the interviewee has the time.
- At the end of the interview, thank them for their time.
- If the person that you interview does not use any of the concepts or terms listed in your questions, you must interview another professional.

GRADE:

At the end of this assignment you must turn in your Interview Sheet and a Professional Profile. The Professional Profile, written as a 2-3 page essay, should explain the job responsibilities of the interviewee, summarize the interview questions, and discuss how the interview influenced your expectations of your Anatomy & Physiology course.

INTERVIEW SHEET

1. What is your name?
2. What is your occupation?
3. Did you attend college to train for this occupation? If so where did you go?
4. Did you take Anatomy & Physiology or a similar course(s) to prepare for this job?
5. Do you use any of these terms/words in your occupation? Did you hear about them or learn them in your A&P course? If not where did you learn about them??

Pericardium	rheumatic fever	auricle/ventricle
Tricuspid valve	epicarditis	endocarditis
Bicuspid valve	calcium channels	systole/diastole
Aortic stenosis	arrythmia	ectopic focus
Vagus	epinephrine	tachycardia
Bradycardia	congestive heart failure	endothelin
Hypertension	hypotension	blood pressure
Osmotic pressure	ventricular fibrillation	heart block
Cardiac arrest	premature ventricular contraction	
6. Do you ever use any of the following equipment or techniques in your job? If so did you learn about them or hear about them in you're A&P class?

Angiography	defibrillation
Electrocardiogram	coronary artery grafts
Monitor blood pressure and pulse	
Cardiac catheterization	
Cardiac stress testing	
7. If you do not use these techniques, do you need to understand something about them in order to do your job?
8. What was the most important thing that you learned in A&P?? in your training program??
9. Is there anything that you think that students in your profession should learn in classes, during their training?

ANATOMY & PHYSIOLOGY BONUS ACTIVITY

Dr. J. Krontiris-Litowitz

CASE STUDY ASSIGNMENT (5% bonus)

The case study simulates a clinical case that a health professional may encounter on the job. You are asked to review the case and provide a diagnosis for the patient. The case studies can be found on reserve at the Maag Library.

Instructions:

- Select a case study form those available on reserve at Maag.
- Read the case study carefully and list the symptoms.
Decide what organ system is primarily involved in the patient's health problems.
- Review your lecture notes and textbook readings that refer to that organ system.
- You may find it helpful to do additional reading. Some textbooks have been placed on reserve Maag (listed below) to assist you in your diagnosis. You may also choose to use other resources such as other books, the Internet, etc... List the resources that you use in a bibliography at the end of your assignment.
- Make a diagnosis based on your readings
- Submit the answers to questions provided, and a typed report consisting of a diagnosis, a 1/2 page rationale for your diagnosis, and a bibliography (if necessary).

Books on Reserve

1. Clinical Health Issues Handbook by Karil Bellah, West Publishing Company, 1993, St. Paul, MN
2. Clinical Manual: Fundamentals of Anatomy and Physiology by Frederick Martini, 1992, Prentiss Hall, Englewood Cliffs, NJ

ANATOMY & PHYSIOLOGY BONUS ACTIVITY

Dr. J. Krontiris-Litowitz

CASE STUDY #1

A 50-year-old airline pilot complained of severe, intense, precordial, crushing, sensation with pain radiating to the left shoulder and down the inside of the left arm, triggered by an "off-duty" tennis match. The chest discomfort brought on by the exertion was relieved by rest. Emergency room examination resulted in the following information:

Heart rate	98/min
Blood pressure	160/110 mm Hg

ECG: ventricular extra-systole arrhythmia (premature ventricular contraction [PVC] as well as S-T segment depression and decreased R wave height.

The following day an exercise tolerance test was performed to test the functional response to graded stress. This symptom-limited test gave an "ischemic" ECG response during exercise, characterized by a downward-sloping S-T segment. Mild exertion resulted in chest pain which was relieved by sublingual nitroglycerin. Coronary angiography showed luminal obstruction at 88% in three major coronary vessels, including the left anterior interventricular (descending) coronary artery. Nitroglycerin, beta-blockers, and calcium channel blockers were tried as pharmacologic therapy. Angioplasty, the procedure in which balloon-tipped catheter is inserted into the partially obstructed vessels, was able to increase coronary flow to near normal value.

Need some help with the diagnosis? Try looking at the books on reserve for some clues (pp. 59 - 77 of Martini or pp.69 -89 of Bellah).

CASE STUDY #1

1. What is the term for the chest pain experienced by this individual?
What is the cause of this pain?
2. Draw a representative tracing of the lead II ECG tracing as described in this case study for this individual and compare it to a normal tracing.
3. What is the site of action for Nitroglycerin?
4. How do normal coronary arteries look compared to this patient's arteries?
5. Describe angioplasty? Are there any disadvantages or complications associated with this procedure?

NAME _____

ANATOMY & PHYSIOLOGY BONUS ACTIVITY

Dr. J. Krontiris-Litowitz

CASE STUDY #2

A 32-year-old nurse who had rheumatic fever as a child noticed a persistent tachycardia and light-headedness. Upon examination, X-rays showed an enlarged left atrium and left ventricle. ECG analysis showed atrial fibrillation. There was also mild pulmonary congestion. Cardiac evaluation resulted in the following information

Cardiac output	3.4 L/min
Blood pressure	100/58 mm Hg
Left atrial pressure	16 mm Hg
Right ventricular pressure	44/8 mm Hg

Heart sounds revealed valvular regurgitation.

Need some help with the diagnosis? Try looking at the books on reserve for some clues (pp. 59 - 77 of Martini or pp. 69 - 89 of Bellah).

NAME _____

CASE STUDY #2

1. Based on the information provided, which A-V valve is incompetent, allowing the regurgitation?
2. Which heart sound would you hear longer and sound more pronounced?
3. Where might you place the stethoscope to best hear the regurgitation?
4. What are the causes of the tachycardia, light-headedness, and pulmonary congestion observed ?

Name _____

ANATOMY & PHYSIOLOGY BONUS ACTIVITY

Dr. J. Krontiris-Litowitz

CASE STUDY # 3

A 5'6", 210 lb, 64 year-old male business executive had a physical exam prior to his retirement from corporate work. His blood pressure was greater than 80/115 on three separate days. Further examination showed normal to low plasma rennin activity, elevated total peripheral resistance, cardiac output of 7.2 L/min, X-ray evidence of left ventricular hypertrophy, retinal hemorrhage, and mild polyuria. Recommended therapy was weight reduction to his ideal level, a low salt diet (< 2 g/day sodium), prudent exercise, and a reduction in alcohol consumption (<3 oz whiskey/day). This change in life style did little to change the condition. Medication was initiated in the form of an oral diuretic and progressed to a beta-blocker; eventually a vasodilator was included to reduce the blood pressure to <140/90 mm Hg.

Need some help with the diagnosis? Try looking at the books on reserve for some clues (pp. 59 - 77 of Martini or pp.69 -89 of Bellah).

Name _____

CASE STUDY #3

1. What is the diagnosis for this individual?
2. What is the site of action of the vasodilator? How will it help him?
3. What would cause the retinal hemorrhage?

LAB 7 ELECTROCARDIOGRAM

Today you will monitor heart function by doing an electrocardiogram (ECG). This technology is widely used by health professionals as a means of monitoring heart function. It is used to diagnose many clinical problems associated with cardiovascular diseases such as cardiomyopathies, heart block, ventricular fibrillation, premature ventricular contraction, or ventricular tachycardia. The technology that you use in your job may be similar to what you will use in this lab.

Objective 1:

To observe an ECG and understand what it represents in terms of heart contraction.

Objective 2:

To monitor heart function by recording and analyzing an electrocardiogram (ECG) of one of your classmates.

Experimental Setup:

Equipment and Materials

- Power Lab 410 Amplifier
- BIO Amp cable
- 3 ECG electrode leads
- disposable electrodes
- alcohol swabs
- Harvard step test box
- Bowl of ice water

Equipment setup:

- Turn on the PowerLab 410 amplifier (rocker switch on back).
 - Turn on computer and click on CHART icon
 - Click on "open file" icon and select "Experiment Settings 410"
 - Select Expt 2-ECG icon
 - A new dialog box has opened. Click on ECG and highlight 'bioamp'
- Set the following numbers:
- Range: 1 mv
 - Hi pass: 1 Hz
 - Lo pass: 20 Hz

Click on OK and close the window

Experimental setup/ECG leads

- Student volunteer should remove watch, jewellery, and other items from wrists and ankles.
- Plug the BIOamp cable into the Bio Amp socket on the amplifier
- Connect the lead wires to the cable. Use earth or ground (green), and ch1 pos(black) and neg (white).

- Snap an electrode onto the end of each lead. The place the electrodes as follows:
 - Left wrist: pos/black lead
 - Right wrist: neg/white lead
 - Right leg: ground/earth green lead

Experimental Procedure 1: ECG in a Resting Volunteer

- Have the subject sit in a comfortable position with arms resting on a laboratory table or in their lap.
- Click on START and collect ECG data. Type in resting ECG in the comment line, hit return and click on ADD. Continue to collect resting ECG data for 45 seconds and then click on STOP to stop recording data.
- Ask the volunteer to open and close their hands and then move both arms across their chest. Note how this causes the tracing to become irregular and move all over the screen. Because of this, the subject should minimize movement during the experimental procedure.
- Save your recording. Click on "File" and then "Save as". Use the filename: ECGexperiment.

Experimental Procedure 2: ECG Following Exercise

In this procedure you will observe the effects of exercise on heart activity by recording the ECG after 2 min of doing the Harvard Step test.

- Remove the lead wires from the cable and clip them to the volunteer's clothing so that they do not interfere with their movement.
- The subject should perform the Harvard Step test for as long as possible, up to a maximum of 5 minutes.

Any student with a known heart problem should not participate as a subject for this experiment.

To do the test:

- Place right foot on the box
- Place the left foot on the box
- Step down with the right foot
- Step down with the left foot
- Repeat sequence at a rate of about 30 times per min (2 seconds per step cycle)

Have someone act as a "pacer" for the exercising volunteer. The pacer will make sure that the subject is maintaining a steady pace, will stop the exercising subject at the end of 5 minutes, and will reattach the lead wires to the cable as soon as the volunteer has finished exercising.

- Record the ECG immediately after exercise by clicking on START. At this time type in the comment "immediately following exercising. Collect at least 45 sec on ECG data.

- At 5 minutes after exercise record the ECG again by clicking on START . At this time type in the comment "5 minutes following exercise". Collect at least 45 sec on ECG data.
- Save your record by clicking on "File" and "Save"

Experimental Procedure 3: ECG After holding your breath

In this procedure you will observe the effects of holding your breath on the ECG

- Have the subject hold their breath as long as they can up to a maximum of 2 minutes. Have someone act as a timer for the experiment.
- Record the ECG immediately after the breath holding by clicking on START . At this time type in the comment "immediately after holding breath". Collect at least 45 sec on ECG data.
- Save your record by clicking on "File" and "Save"

Experimental Procedure 4: The Effect of Noxious Sensory Stimulus on the ECG

In this procedure you will use the "cold pressor test" to observe the effects of a noxious stimulus, ice water, on the ECG.

- Record the ECG of the subject as they sit quietly clicking on START. At this time type in the comment "second resting ECG". Collect at least 45 sec on ECG data and then click on STOP.
- Have the subject place their hand in a bucket of ice water.
- Record the ECG after 1 minute of ice water by clicking on START. At this time type in the comment "1 minute of ice water". Collect at least 45 sec on ECG data and then click STOP.
- Record the ECG after 3 minute of ice water by clicking on START. At this time type in the comment "3 minute of ice water". Collect at least 45 sec on ECG data and then click STOP.
- Have the subject remove their hand from the ice water.
- Save your record by clicking on "File" and "Save"

DATA ANALYSIS

Analysis for Experimental Procedure 1: ECG at rest

- Scroll back to the beginning of the experiment to the first comment where you recorded resting ECG. You can do this in one of two ways:
 1. Click on "windows" on the toolbar at the top of the screen. Then click on "comment window". Select the comment 'resting ECG' by highlighting it. Then click on "go to" and the screen will scroll back to the beginning where you recorded the resting ECG
 2. Use the scroll bar at the bottom of the screen and move backward until you see "1" which indicates comment 1 or resting ECG.
- Measure the amplitude of the P wave, QRS complex and T wave and record it in the Table 1. To measure the amplitude move the cursor to the peak of the wave and record the value in mv shown to the right to the ECG record.
- Measure the duration of the cardiac cycles. To do this, drag the **M** found in the lower right corner over the peak of the QRS complex. Drag the cursor to the peak of the next QRS complex and record the time shown in the upper right corner. Record the duration of 3 cardiac cycles, take the mean and write it in Table 2.

Duration of Cardiac Cycle 1 _____

Duration of Cardiac Cycle 2 _____

Duration of Cardiac Cycle 3 _____

Mean Duration of the Cardiac Cycle at rest _____

- Calculate the heart rate at rest as follows:

$$\text{heart rate} = \frac{60 \text{ sec}}{\text{duration of cardiac cycle}}$$

Analysis for Experimental Procedure 2: ECG Following Exercise

- Scroll back where you recorded ECG after exercise. You can do this in one of two ways:
 1. Click on "windows" on the toolbar at the top of the screen. Then click on "comment window". Select the comment 'exercise ECG' by highlighting it. Then click on "go to" and the screen will scroll back to the beginning where you recorded the exercise ECG
 2. Use the scroll bar at the bottom of the screen and move backward until you see "2" which indicates comment 2 or exercise ECG.
- Measure the amplitude of the P wave, QRS complex and T wave and record it in the Table 1. To measure the amplitude move the cursor to the peak of the wave and record the value in mv shown to the right to the ECG record.
- Measure the duration of the cardiac cycle. Record the duration of 3 cardiac cycles, take the mean and write it in Table 2.

Analysis for Experimental Procedure 3: ECG Following Holding Breath

- Scroll back where you recorded ECG after holding breath.
- Measure the amplitude of the P wave, QRS complex and T wave and record it in the Table 1.
- Measure the duration of the cardiac cycle. Record the duration of 3 cardiac cycles, take the mean and write it in Table 2.

Analysis for Experimental Procedure 4: ECG after placing hand in ice bath

- Scroll back where you recorded ECG 1 minute after placing hand in ice bath.
 - Measure the amplitude of the P wave, QRS complex and T wave and record it in the Table 1.
 - Measure the duration of the cardiac cycle. Record the duration of 3 cardiac cycles, take the mean and write it in Table 2.
 - Scroll back where you recorded ECG 3 minute after placing hand in ice bath.
 - Measure the amplitude of the P wave, QRS complex and T wave and record it in the Table 1.
- Measure the duration of the cardiac cycle. Record the duration of 3 cardiac cycles, take the mean and write it in Table 2

ECG Lab Report

NAME _____
Lab Section _____

Table 1

	Amplitude at rest	Amplitude immediately after exercise	Amplitude 5 min after exercise	Amplitude after holding breath	Amplitude 1 min after ice bath	Amplitude 3 min after ice bath
P Wave						
QRS Complex						
T Wave						

Table 2

EVENT	DURATION OF CARDIAC CYCLE (SEC)
At rest	
After exercise	
After holding breath	
After 1 min in ice bath	
After 3 min in ice bath	

LAB 8 BLOOD PRESSURE

Blood pressure reflects the function of many of the body's organ systems. Any deviation from normal blood pressure alerts the health professional to a clinical problem. Consequently, it is almost always included in a physical exam. Most health professionals monitor blood pressure by the traditional methods using a sphygmomanometer and a stethoscope. Today you will use a different technology, computer-assisted data acquisition of blood pressure. While you may not use this technique in your job it will give you an idea of the many possible applications of the computer in the health sciences in the future.

Objective 1: To monitor blood pressure using computer-assisted technology.

Objective 1: To observe blood pressure measurement and understand how it can vary with physical activity and health status.

Experimental Setup:

Equipment and Materials

- Power Lab 410 Amplifier
- Bridge Amplifier
- Sphygmomanometer
- Exercise mat or cot to lie on during experiment
- Harvard step test box
- Bowl of ice water

Equipment setup:

- Attach 9-pin cable (grey cord) to rear of bridge amplifier at the socket labeled "input".
- Attach other end of the 9-pin cable to the back of Power Lab 410 unit at the socket labeled "IC Port".
- Connect the BNC cable (black cord) to the rear of the bridge amplifier at the plug labeled "analog output".
- Connect the other end of the BNC cable to the front of the Power Lab 410 unit at Channel 2
- Connect the BNC plug on one end of the finger pulse transducer to the BNC socket for channel 1 on the front of the Power Lab 410 unit.

Experimental setup: Attaching the pressure cuff and finger pulse transducer

- Student volunteer should remove watch, jewellery, and other items from one arm (either arm).
- Place the blood pressure cuff around the upper portion of the arm of the volunteer between the elbow and the shoulder. Secure the Velcro so that it is snug but not tight.

- Place the pressure pad of the finger pulse transducer against the distal segment of the middle finger of hand that has the pressure cuff. Use the Velcro strap to secure --- neither loose nor tight.

Calibrating the pressure cuff:

- Turn on the PowerLab 410 amplifier (rocker switch on back).
- Place blood pressure cuff on volunteer's arm (see below)
- Turn on computer and click on CHART icon
- Click on menu at the right of channel 2 and select "Bridge amp"
- At the dialog box set the following numbers:
 - Range: 5 mv
 - Hi pass: DC
 - Lo pass: 100 Hz
 - Click on [ZERO]
- Inflate the pressure cuff until the sphygmomanometer reads 50 mm Hg and record the millivolts (mv) shown on the recording on the screen.
- Inflate the pressure cuff until the sphygmomanometer reads 100 mm Hg and record the millivolts (mv) shown on the recording on the screen.
 - A. 50 mmHg = _____ mv
 - B. 100 mm Hg = _____ mv
- Click on "Units"
- At "Point 1" type in the number from A. 50 mv (above)
- At "Point 2" type in the number from B. 100 mv (above)
- Click on "Units" and select mm Hg from the list
- Click on "Apply"
- Click "OK"
- Click "OK"
- Click on OK and close the window
- Click on Channel 1 and select "Input Amp"
- At the dialog box set the following numbers:
 - Range: 200 mv
 - Click on "50 Hz LP" so that a check shows in the box
 - Click on "positive" so that a check shows in the box
- Click on "OK" and close the dialog box

Experimental Procedure 1: Blood Pressure in a Sitting Volunteer

- You will need 3 people in your group for these experiments, the experimental subject, someone to regulate the sphygmomanometer, and someone to record the data and comments at the computer.

- Have the subject sit in a comfortable position with arms resting on a laboratory table or in their lap.
- Observe the chart window. Note that channel 1 is the record of the finger pulse and channel 2 is the recording of the pressure in the blood pressure cuff.
- Click on START and record the finger pulse for about 10 seconds. Type "sitting blood pressure" in the line for comment 1, hit return and click ADD. Inflate the cuff until the pressure is just above 180 mm Hg. Note that the pulse signal disappears. Why?
- Slowly deflate the cuff at a rate of 1-2 mm Hg per second. Type 170 at the comment line when the cuff pressure reaches 170 mm Hg, 160 when the cuff pressure reaches 160 mm Hg, etc until the pressure reaches 50 mm Hg. Then release the remaining cuff pressure quickly. When you see the pulse return enter a blank comment. This is systolic pressure. You will not be able to determine diastolic pressure from the pulse signal. Why?
- Note the cuff pressure from channel 2 and record it in Table 1.
- Save your recording. Click on "File" and then "Save as". Use the filename: BPexperiment.

Experimental Procedure 2: Blood Pressure in a Prone Volunteer

- Have the subject lie down on a cot or mat in a comfortable position with arms at their sides.
- Click on START and record the finger pulse for about 10 seconds. Type "prone blood pressure" in the line for comment, hit return and click ADD. Inflate the cuff until the pressure is just above 180 mm Hg.
- Slowly deflate the cuff at a rate of 1-2 mm Hg per second. Type 170 at the comment line when the cuff pressure reaches 170 mm Hg, 160 when the cuff pressure reaches 160 mm Hg, etc until the pressure reaches 50 mm Hg. When you see the pulse return enter a blank comment. This is systolic pressure. At 50 mm Hg release the remaining cuff pressure quickly and click STOP.
- Note the cuff pressure from channel 2 and record it in Table 1.
- Save your recording. Click on "File" and then "Save as". Use the filename: BPexperiment.

Experimental Procedure 3: Blood pressure Response to Noxious Sensory Stimulus/Ice water

In this procedure you will use the "cold pressor test" to observe the effects of a noxious stimulus, ice water, on the ECG.

- After you have determined 'prone' systolic pressure remove the finger pulse transducer and place their hand in a bucket of ice water for 60 seconds.
- Replace the finger pulse transducer as quickly as possible.
- Click on START and record the finger pulse for about 10 seconds. At this time type cold shock" in the line for comment, hit return and click ADD. Inflate the cuff until the pressure is just above 180 mm Hg.
- Slowly deflate the cuff at a rate of 1-2 mm Hg per second. Type 170 at the comment line when the cuff pressure reaches 170 mm Hg, 160 when the cuff pressure reaches 160 mm Hg, etc until the pressure reaches 50 mm Hg. Then

release the remaining cuff pressure quickly. When you see the pulse return enter a blank comment and click STOP.

- Note the cuff pressure from channel 2 and record it in Table 1.
- Save your record by clicking on "File" and "Save"

Experimental Procedure 4: Blood Pressure Following Exercise

In this procedure you will observe the effects of exercise on heart activity by recording the ECG after 2 min of doing the Harvard Step test.

- Have the subject sit in a comfortable position with arms resting on a laboratory table or in their lap.
- Click on START and record the finger pulse for about 10 seconds. Type " blood pressure prior to exercise" in the line for comment 1, hit return and click ADD Inflate the cuff until the pressure is just above 180 mm Hg.
- Slowly deflate the cuff at a rate of 1-2 mm Hg per second. Type 170 at the comment line when the cuff pressure reaches 170 mm Hg, 160 when the cuff pressure reaches 160 mm Hg, etc until the pressure reaches 50 mm Hg. Then release the remaining cuff pressure quickly. When you see the pulse return enter a blank comment and click STOP.
- Note the cuff pressure from channel 2 and record it in Table 1.
- Now have the subject perform the Harvard Step test for at least 2 minutes or up to a maximum of 5 minutes.

Any student with a known heart problem should not participate as a subject for this experiment.

To do the test:

- Place right foot on the box
- Place the left foot on the box
- Step down with the right foot
- Step down with the left foot
- Repeat sequence at a rate of about 30 times per min (2 seconds per step cycle)

Have someone act as a "pacer" for the exercising volunteer. The pacer will make sure that the subject is maintaining a steady pace, will stop the exercising subject at the end of 5 minutes, and will reattach the lead wires to the cable as soon as the volunteer has finished exercising.

- As soon as they have finished take their blood pressure. Note the cuff pressure from channel 2 and record it in Table 1.
- Save your recording. Click on "File" and then "Save as". Use the filename: BPexperiment.

Blood Pressure Lab Report

NAME _____

Lab Section _____

Table 1

	Sitting	Prone	After Ice Water	Before Exercise	After exercise
Systolic Pressure					
Pulse					

- Why does the pulse disappear when you inflate the cuff?
- When the pulse pressure reappears you have reached systolic pressure. Why is this? Why isn't it diastolic pressure?
- What effect does lying down have on blood pressure?
- How can you measure diastolic pressure?

Contextual Learning for School-Aged Children

Arts and science courses can look to the contextual learning effort sweeping schools. Including real application context in the conveying of concepts and problem solving helps college students learn, become enthusiastic about the discipline, and become thinkers in the discipline.

The following two examples address contextual learning for math and science in school aged children. The first unit addresses math concepts and problem solving. It asks children to set up rational equations to help them solve real world problems dealing with wild life management. The philosophy is that "keeping the mathematical problems closely connected to those found in local businesses helps to create the contexts that can nurture the growth of mathematical thinking. Working together with business and community partners, teachers can create an effective setting that helps students experience authentic problem solving which can serve as a basis for learning important mathematics outlined in the N.C.T.M. standards" (p. 3 of this unit). In this unit relevancy is enhanced by a field trip to Ohio Division of Wild Life District three on Portage Lakes Drive in Akron.

The second unit addresses science thinking and concepts. It asks children to conduct an experiment to explore the concept of calorie. The children communicate with businesses and professionals as they explore the application of the calorie concept in the work place. "To ensure that connections are made beyond the instructional context, students will explore the application of calories in a variety of settings, such as heating

Integrating School-To-Work Principles in Teacher Education Programs at Kent State University

Curriculum Resources in Math and Science Education

By the project work team:

Patrick J. O'Connor, Principal Investigator, KSU
Richard Mitchell, Vocational Education, KSU
David Keller, KSU-Science Education
Michael Mikusa, KSU-Math Education
Kim Costarella, Tallmadge Middle School
Jamie Loudin, Akron Hoban High School

With funding from the Ohio School-to-Work Office, the State University Education Deans have established a System Integration Coalition to undertake this work, along with three other related interuniversity projects. The Ohio State University college of Education has provided project management for the Coalition.

This publication is supported by a state grant from the federal School-to-Work Opportunities Act of 1994. The opinions expressed herein do not necessarily reflect the position or policy of the U.S. Department of Labor, and no official endorsement by the U.S. Department of Labor should be inferred.

As an equal opportunity employer and service provider, it is the policy of the state school-to-work office and supporting agencies that educational activities, employment practices, programs, and services are offered without regard to race color, national origin, sex, religion, disability, or age in employment or the provision of services.

A UNIT ON RATIONAL EQUATIONS AND THEIR APPLICATIONS

By Jamie Loudin, Akron Hoban High and Dr. Michael Mikusa, Kent State University

There is an interesting phenomenon in mathematics education that exists which is very puzzling to me. There is a widely accepted notion that mathematics is important and useful for everyone to know, and at the same time people are quite willing to share and even boast of their lack of knowledge or ability to do mathematics. I am finding that these people have a firm belief that mathematics is all about remembering facts, formulas, and rules. And furthermore, that the faster a person can compute or remember these facts and rules, the greater mathematics ability he/she has.

This could not be further from the truth! Our society and economy is not dominated by industry, as it was 20 to 30 years ago. The mathematical skills necessary for students to be successful in the workplace today are quite different from the "shopkeeper" mathematics required in the pre-computer era. The availability of computers and calculators has helped to redefine what mathematics is important and necessary to know.

The NCTM (National council of teachers of mathematics) recognized that the mathematics necessary for all people who will be living and working in the 21st century was changing. Henry Pollak, an industrial mathematician, summarized the mathematical expectations of new employees in industry as:

The ability to set up problems with the appropriate operations;

Knowledge of a variety of techniques to approach and work on problems;

Understanding of the underlying mathematical features of a problem;

The ability to work with others on problems;

The ability to see the applicability of mathematical ideas to common and complex problems;

Belief in the utility and value of mathematics;

Preparation for open problem situations, since most real problems are not well formed.

In 1989, the N.C.T.M. published a new set of curriculum standards for school mathematics with these new goals as a guide. The vision of mathematics described in this document is also based on the assumption that knowing mathematics is doing mathematics and that all students create their own understanding of mathematics by making personal sense of mathematical ideas. Students should therefore be involved in solving problems that come out of meaningful (to them) contexts.

Another reform effort aimed at helping students learn the importance of becoming problem solvers is School to Work. Keeping the mathematical problems closely connected to those found in local businesses helps to create the contexts that can nurture the growth of mathematical thinking. Working together with business and community partners, teachers can create an effective setting that helps students experience authentic problem solving which can serve as the basis for learning important mathematics outlined in the N.C.T.M. standards. What follows is our attempt at integrating the goals of both of these reforms in a unit in a high school mathematics class.

OBJECTIVES

- *Students will set up rational equations to help them solve real world problems (School Based)
- *Students will interact with (ask questions, respond to questions and listen) a wild life management specialist (Work site Based)
- *Students will successfully conduct their own capture/recapture experiment successfully (School Based)
- *Students will use the Internet to find evidence of other population experiments. (School/Home Based)

LEARNING ACTIVITIES

[Initial activity is School Based]

1. Define the Problem to your students. Generate a discussion about the various perspectives of the park ranger, the animal rights activists, and even the deer. The Rangers at a state park noticed that there might be too large a deer population, they decide that they will sell a few hunting licenses to deer hunters to thin the population. Soon after they announce their plan, they receive calls from animal rights groups asking for proof about the large number of deer. The manager from the park tells them that a capture/recapture has been conducted and that 35 deer were captured, tagged, and released. A few weeks later 25 deer were "recaptured" and of those deer 7 had tags.

After the introduction of the problem above and some initial reasons for each group's perspective have been shared, the following questions will be posed to the students.

1. How many deer are estimated to be in the park?
2. Do you think capture/recapture is a valid method of population estimation?
3. Do you think there is any other way to take care of the population problem besides hunting the deer?

Students should form groups to discuss and formulate answers to the above questions.

[Lesson #2 School Based]

2. After some initial discussion among groups regarding the first day's questions about the problem, students will be encouraged to use their knowledge of rational equations to answer the questions they have been discussing in small groups. Frequently students will suggest to do a simulation of the capture-recapture. If students do not suggest after working in groups on this problem, you should suggest they do the following experiment.

The Experiment: The teacher should set-up a large bag of Styrofoam peanuts (or any cheap thing you can get a lot of) for each small group of students. The Styrofoam peanuts in each bag represent the number of deer in the population. Note that you should use large numbers of Styrofoam peanuts for each bag so that students aren't tempted to count the total number. Each bag should contain a different amount of peanuts and this number should be recorded for later use. Ask the students to capture-tag-recapture, as many times as they like, being sure to shake up the bag each time and keep a record of everything they discover. After they have repeated this procedure enough times and they feel they can predict what will happen, ask them to estimate the number of "deer" in their bags. Students will be amazed at how close they come to the correct number!

During this experiment encourage the students to ask questions that prepare them for the field trip. For example:

- How do they catch the deer?
- How much does it cost to catch the deer and tag them?
- Is it reasonable and affordable to do the capture and recapture several times?

In a Real Life situation how do they mix up the population?

Writing these down is a good idea and sharing them with the park manager may make the field trip more interesting.

[Work site based]

3. The Field Trip: Ohio Division of Wild Life District Three is located at 912 Portage Lakes Drive in Akron, the number is (330) 644-2293. Park managers will agree to meet at a range of parks in the area to talk about wildlife population whether it is deer or fish. An hour long trip will be sufficient to allow the students to see the work place and "tools of the trade" as well as to ask questions of the wildlife management expert. Be sure that the questions that came up in class are covered, and encourage each student to ask or answer a question related to the problem introduced earlier in class.

4. Alternatives to onsite visit Virtual Visit: spend real time with an on-line wildlife professional in your school. You can visit Yellowstone National Park this way! Guest Speaker: The Ohio Environmental Protection Agency has agents who could come to your classroom to explain how they determine how many and what type of fish live in the lakes, rivers, and streams around the state. You could invite one into your classroom and have them bring and demonstrate the "tools of the trade" with your class.

Individual projects: Have students visit various occupations that do sampling. Many manufacturing companies use a form of sampling to determine the quality of the products they are making. Have students create a common set of questions to take on their visit. Each should prepare a 5 - 10 minute presentation to describe the nature of the work-site they visited and the answers to the common set of questions they received.

5. Follow up and Assessment:

Students will set up their own population problem to be shared with another group, and in turn will receive a problem from a group to solve. Watch for group interaction and listen to questions and the vocabulary that is being used. Students will be asked to use the Internet to find a sight that deals with these problems in some way and to write a summary of the sight. I had luck searching using "animal rights" and "population density".

A UNIT ON CALORIES

Prepared by Kim Costarella, Tallmadge Middle School and Dr. David Keller, Kent State University

Many institutions and organizations have examined the nature of science education in American schools during the past few years. Three commonalities are found in all these studies. First, United States students study more topics in science than their international counterparts. This has resulted in a curriculum "a mile wide and an inch deep." The second commonality is that science education needs to move from a "content based, to a process based, curriculum. Third, science education needs to become much more integrated, both from the aspect of integrating the life, earth, and physical sciences, and from the aspect of integrating the processes of science with other fields such as mathematics, social studies and language arts.

These three concerns for change parallel the philosophy of School to Work. With the availability of technology, science classrooms can be much more centered on authentic experiences and the immediate world of our students. An understanding of science and the processes of science are of increasing importance in the workplace. The integration of the philosophy of School to Work into science education will be a key to reaching the goals of the National Science Education Standards as defined by the National Research Council and supported by the National Science Teachers Association.

UNIT OVERVIEW

The following sample instructional unit is designed to expose middle level learners to the concept of a calorie as a measure of heat. By developing a thorough understanding of the calorie, students can apply the concept to solve problems, make relationships, and establish clear distinctions. To ensure that connections are made beyond the instructional context, students will explore the application of calories in a variety of settings, such as heating and air conditioning, dietary nutrition, the medical field, sports physiology, and food production.

The unit is composed of suggested learning activities. Teachers and students may choose to explore several activities in the classroom and use the remaining activities as extended searches. Each activity integrates school-based learning, work-based learning, and connecting activities. A sample lesson plan is included for the culminating activity. The culminating event requires students to work cooperatively with a business to design and operate a school-based enterprise.

OBJECTIVES

- *Students will conduct an experiment to explore the concept of a calorie and develop an in-depth understanding of the term
- *Students will apply the concept of a calorie when problem-solving
- *Students will relate increase/decrease in body temperature to caloric production and action
- *Students will communicate with several businesses and professionals in the community to inquire about the application of calories in the work place
- *Students will work cooperatively with a local food production company to create a School-Based food enterprise

LEARNING ACTIVITIES

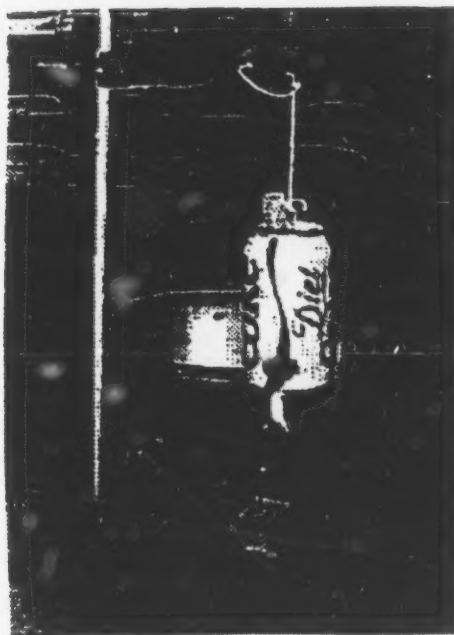
1. Measuring calories

A calorie is the amount of heat needed to raise one ml of water one degree Celsius. Calories used for nutritional measurements are 1000 calories and are denoted by using a capital C (Calorie)

[School-Based]

Using an aluminum can calorimeter, students will measure the amount of calories that are burned from one peanut.

1. 100 ml of water is placed in an aluminum beverage can.
2. The temperature of the water is noted.
3. A peanut is burned below the calorimeter so that the heat from the burning peanut is absorbed into the calorimeter.
4. The temperature of the water is noted and the number of degrees that the water was heated is calculated. $[T_f - T_i = \Delta T]$
5. By multiplying the change in temperature times the number of ml of water in the calorimeter, the number of calories is determined. $[\text{ml of H}_2\text{O} \times \Delta T = \text{calories}]$



1. Measuring Calories (Cont.)

[Work-Based]

Students will contact Meal on Wheels or other service agency to inquire about how meals are designed based on the number of calories and the percentage of fats, proteins, and carbohydrates.

[Connecting Activities]

- Students will research their daily calorie requirements by measuring their body fat percentages and calculating their lean body mass
- Students will keep a daily personal food journal and analyze their caloric consumption
- Students will design a personal nutritional program based on their caloric requirements
- Students will analyze the nutritional content of the meals offered by their school cafeteria and design a "Healthy Lunch Selection Menu".

2. Calculating mean body temperature

Recent research conducted by the Journal of American Medical Association suggest that the mean body temperature is approximately 98.2 F. Students will calculate the mean normal body temperature of the class and compare the results.

[School-Based]

Students will create a data set of the group's temperature and investigate the following:

1. The mean temperature of the class
2. The range of normal temperatures
3. Are there significant differences between male and female temperatures?
4. When should body temperature be considered abnormal?

[Work-Based]

Students will visit a medical facility to learn:

- *The correct procedure for measuring body temperature
- *Why body temperature is measured
- *What is considered an abnormal body temperature
- *What abnormal temperatures might indicate
- *What treatments are available to reduce body temperature
- *Other questions/concerns the students develop

[Connecting Activities]

- *Students will investigate why humans shiver or sweat and design an experiment to research the effect of these processes on body temperature.
- *Students will design and conduct an experiment to investigate the effect of food consumption on body temperature

3. Calculating Basal Metabolic Rate

The amount of energy required by the body in a sedentary state is defined as basal metabolic rate (BMR).

[School-Based]

Students will calculate their BMR and investigate the effect muscular activity has on energy requirements.

BMR is = 1C./kg/hr for males

BMR is = 0.91C./kg/hr for females

- *Students will measure their sedentary body temperature before a defined exercise period such as running around the school track for 15 minutes.

*Students will, after the exercise, find the change in their body temperature. For better results students need to be well insulated during the exercise. Students could design their own insulated clothing

*Students will make a calculation of the number of calories burned by their body by measuring their body mass in grams (Kg times 1000)

*Students will relate the effect muscular activity has on body temperature to changes in metabolic rate

[Work-Based]

Students will interview sports physiologists or other fitness experts to inquire more about the processes of BMR and burning energy in the body.

[Connecting Activities]

Students will create a detailed personal exercise program designed to increase metabolic rate.

4. Accounting for dissipation of body heat in climate control

The human body constantly exchanges heat with the environment through convection. Students will relate the dissipation of body heat to fluctuations in room temperature.

[School-Based]

Students will research the amount of heat produced by their bodies during a sedentary period and estimate the amount of heat dissipated into the classroom. Students will then calculate the amount of air conditioning required to maintain the room temperature based on a given variable (number of people, room size).

[Work-Based]

- Students will consult with heating and air conditioning contractors to examine the variables, such as how many people will occupy the facility, in designing a heating and air conditioning system.
- Students will make comparisons of the quality and amount of insulation used in different structures.
- Students will visit the county coroner to investigate how the estimated time of death is determined using body and room temperature.

[Connecting Activities]

Students will work collaboratively with heating and air conditioning contractors to design a climate control system for the school building. Students will generate the design plans and cost of installing a system. If

the school building already contains an air conditioning system, the new plans will be compared with the existing system.

The following is sample lesson plan that incorporates school-based, work-based, and connecting activities.

EDIBLE ENDEVOURS

Overview:

Students will work cooperatively with a local food production company to design and operate a school-based enterprise.

Objectives:

- *Students will perform general elements of food service production and management**
- *Students will define personnel management in relation to the operation**
- *Students will explain the functions and nutritional value of three food products produced**
- *Students will demonstrate a working knowledge of proper food preparation techniques**
- *Students will organize resources for the management and supervision of quality and quantity of food production**

Procedure:

1. Students will tour a local food production company to inquire about how the facility is structured
2. Students will organize themselves into departments (i.e. management, marketing, accounting, distribution, research and development, manufacturing) and elect division leaders.
3. Each department will work with the company to:
 - *Participate in a company training program**
 - *Work with a mentor from the company to explore the job skills required to complete various tasks**
 - *Job shadow**
4. Students will work collaboratively with company to design and operate a food-based company. Each department will be responsible for the development and operation of their division. The following is a list of suggested activities:
 - Conduct research to decide what food to produce (i.e. cookies, candy, peanut butter and jelly sandwiches)

- Perform price/taste comparisons on ingredients
 - Run a cost analysis including raw materials and labor
 - Develop food preparation/packaging procedures in accordance to federal guidelines
 - Analyze nutritional content and create food labels
 - Create/Implement a marketing campaign
 - Establish start-up cost
 - Operate the business
5. The profits generated from the business endeavor will be donated to a local food bank

Assessment Suggestions:

The success of the business will be evaluated by the students, teacher, and business mentors.

- Develop a rubric with input from students, teachers, and mentors to assess: individual success, group success, and cooperative skills.
- Analysis of net profits by developing charts and graphs
- Customer-surveys
- The following questions will be used by the students to evaluate the success of the business. The responses will be used to examine student learning:
 1. How would you restructure the company to cut production costs and eliminate waste?
 2. How could technology be used to lower production cost?
 3. How would you expand the business? Would you add a work shift?
 4. What other products should our company produce?
- Culminating Presentation
 1. Outline the planning/development/implementation of the operation
 2. Research findings
 3. Overall evaluation of the success of the business

IV. ADDITIONAL RESOURCES

A. Professional and Resource Associations

The following professional associations can be consulted for further information on school-to-work, contextual and authentic learning:

Association for Supervision & Curriculum Development (ASCD) is an international community of educators dedicated to the improvement of instructional supervision, instruction, and curriculum design. ASCD disseminate information on education research and classroom practices and forges links among educators through publications and training programs, seminars and conferences. ASCD is particularly interested in the general topic of curriculum integration and has sponsored both publications and conferences on this subject. 1250 North Pitt Street, Alexandria, VA 22314-1453. (703) 549-9110.

Center for Law and Education's VOCED Project works with schools and communities to develop school-to-work systems and improve occupational education programs. The VOCED Project publishes policy papers as well as practical guidelines and conducts workshops and conferences on how to improve programs. 1875 Connecticut Avenue, NW, Suite 510, Washington, DC 20009. (202) 986-3000.

Center of Occupational Research and Development (CORD) is a service organization that helps educators in schools and industry address the technical education, training, and retraining needs of workers. A primary organizational focus is the development of applied academic curricula. Among the curricula available from CORD are *Applied Mathematics*, *Applications in Biology/Chemistry*, *Principles of Technology*, and *Tech Prep Resources*. 601 Lake Air Drive, P.O. Box 21689, Waco, TX 76702-1689. (817) 772-8756.

National Consortium for Product Quality (NCPQ) is a project funded by the National Center for Research in Vocational Education and directed by the Center on Education and Work, University of Wisconsin-Madison. The NCPQ was established to accomplish a two-fold mission: (1) to develop, research, and implement school-to-work product standards; and (2) to develop a national review process by which school-to-work material can be collected, evaluated, and disseminated. Center on Education and Work, 964 Education Sciences Building, 1025 West Johnson Street, Madison, WI 53706. (608) 263-3152. Internet: bdougherty%cew@soemadison.wisc.edu.

The National Network for Curriculum Coordination In Vocational and Technical

Education (NCCVTE) is a nationwide network of six curriculum coordination centers sponsored by the U.S. Department of Education, Office of Vocational and Adult Education. The network promotes sharing of curricula, professional development of state and local educators, research in curriculum design methodology, and coordination of development among states. The six centers are at the following locations:

*East Central Curriculum Coordination Center, Sangamon State University, F-2, Springfield, IL 62794-9243. (217) 786-6173/

*Midwest Curriculum Coordination Center, Oklahoma Department of Vocational and Technical Education, 1500 W. 7th Avenue, Stillwater, OK 74074-4364. (405) 743-5192.

*Northeast Curriculum Coordination Center, New Jersey State Department of Education, Division of Vocational Education, Crest Way, Aberdeen, NJ 07747. (908) 290-1900/

*Northwest Curriculum coordination Center, Saint Martin's College, Old main, Room 478, Lacey, WA 98503. (206) 438-4456.

*Southeast Curriculum Coordination Center, Mississippi State University, Research and Curriculum Unity, P.O. Drawer DX, Mississippi State, MS 39762. (601) 325-2510.

*Western Curriculum Coordination Center, University of Hawaii at Manoa, College of Education, 1776 University Avenue, Wist 216, Honolulu, HI 96844-0001. (808) 956-7834.

The Academy for Educational Development's National Institute for Work and Learning seeks to bring the work, education, government, and community sectors together around the shared goal of working collaboratively to improve education-work relationships in the interests of individuals and society. It accomplishes this mission through research, program documentation and evaluation, policy analysis, technical assistance and training, and information networking. 1875 Connecticut Avenue, NW, Washington, DC 20009. (202) 884-8186.

The Institute on Education and the Economy (IEE) at Columbia University is a multi-disciplinary research and technical assistance center. IEE Conducts research on the implications of changes in the economy and labor markets for all levels of education and training systems in the United States. The Institute also provides technical assistance and evaluation services to schools, school districts, and states

involved in work-related education reform. Teachers College, Box 174, 525 West 120th Street, New York, NY 10027. (212) 678-3091. irr@columbia.edu.

Jobs for the Future (JFF) is a national, nonprofit organization that conducts research, provides technical assistance, and proposes policy innovation on the interrelated issues of work and learning. JFF's goal is to encourage policies and practices that prepare all citizens for successful transitions between learning and work. One Bowdoin Square, Boston, MA 02114. (617) 742-5995. Jff@jff.org.

The National School-to-Work Learning & Information Center, 400 Virginia Avenue, Room 150 Washington, DC 20024, Phone: 1-800-251-7236, Fax: 202-401-6211, E-mail: stw-lc@ed.gov

Ohio School-to-Work, 131 N. High St., Suite 500 Columbus, OH 43215, Phone: (614) 728-4630, Fax: (614) 728-6188, Internet: www.ohio-stw.com

B. Additional Reading

The following readings can be consulted to learn more about school-to-work as a framework for planning and delivering instruction.

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